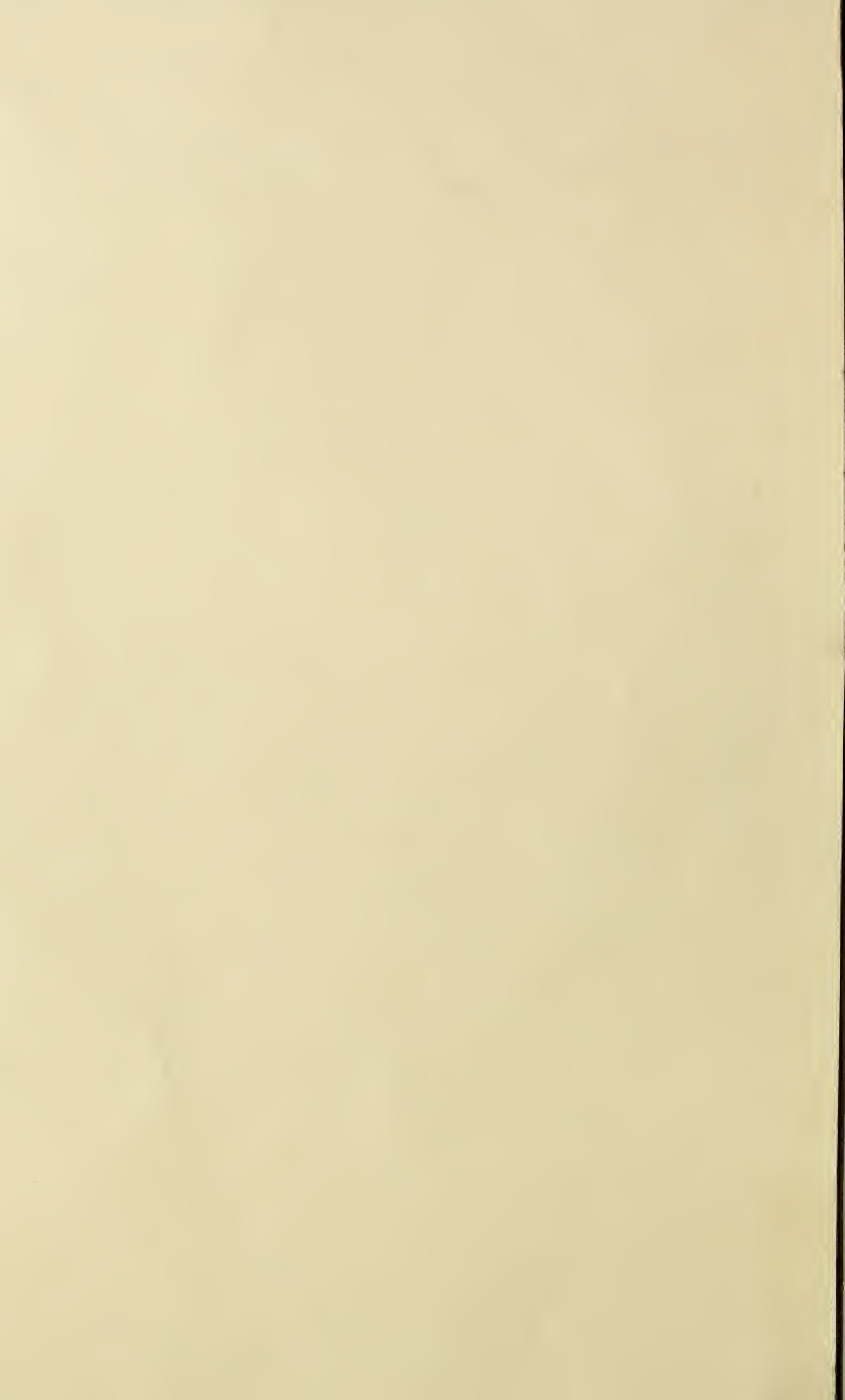


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The Agricultural Student



HORTICULTURE NUMBER

March 1915

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Ask Us All About It.

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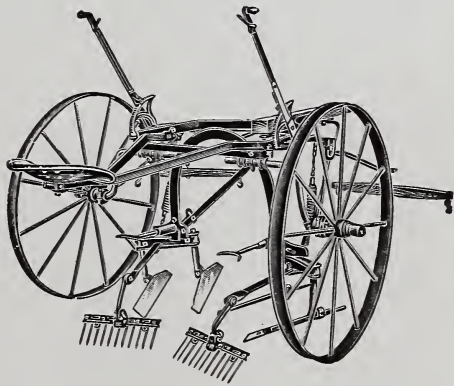
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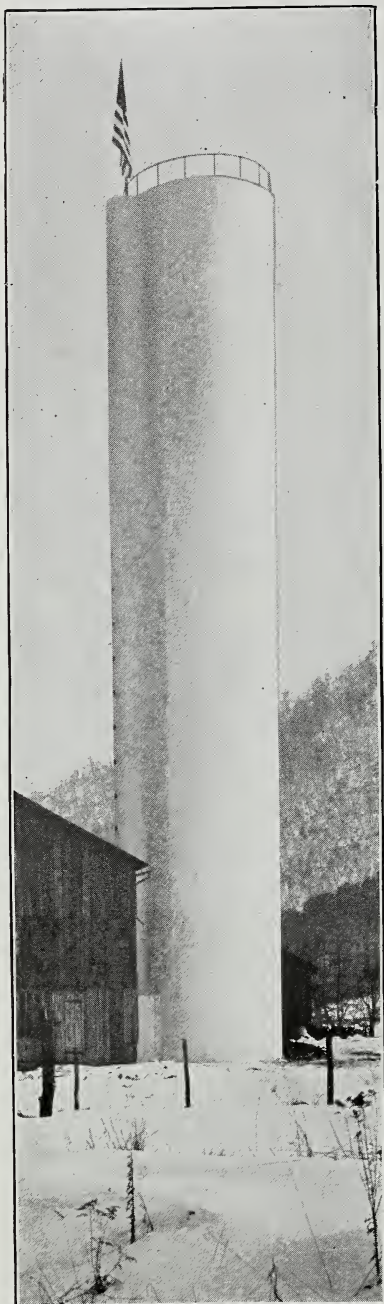
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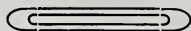
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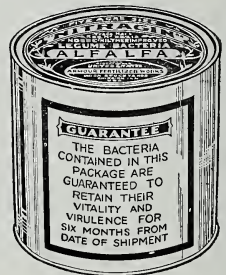
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Whatsoever a Man Soweth That Shall He Also Reap.

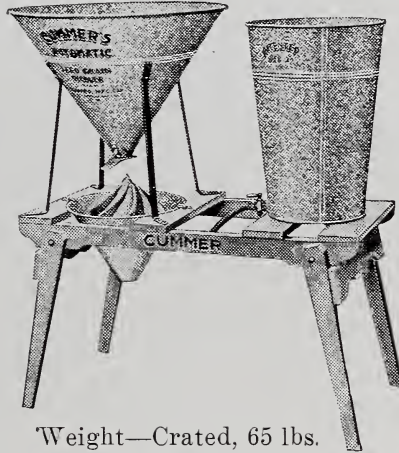
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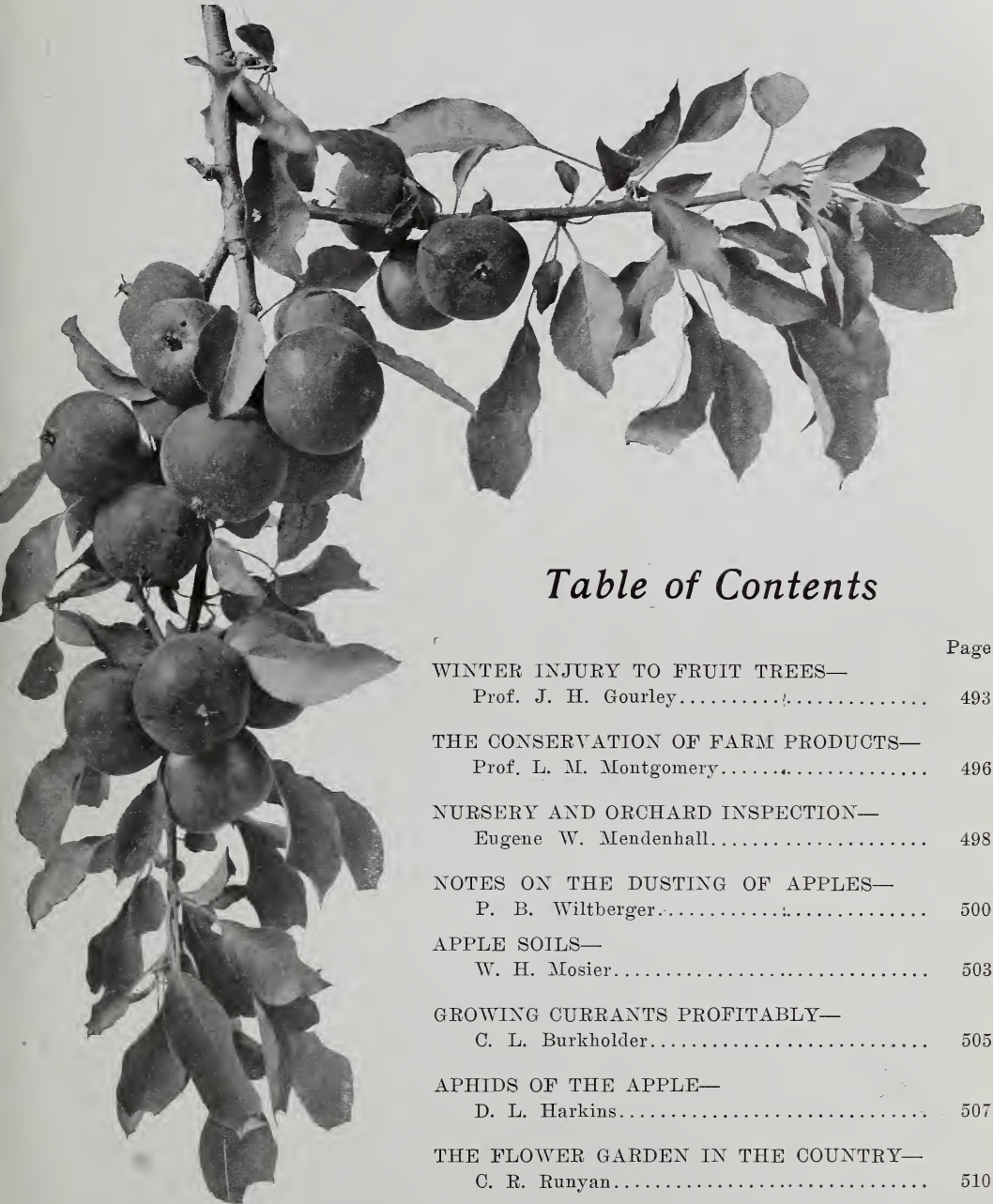


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IRRIGATED APPLE ORCHARD IN COLORADO.

THE AGRICULTURAL STUDENT

Vol. XXI.

OHIO STATE UNIVERSITY, COLUMBUS, MARCH, 1915

No. 7

WINTER INJURY TO FRUIT TREES

J. H. GOURLEY

Professor of Horticulture, New Hampshire College of Agriculture

WINTER injury behaves in a variety of ways. With the peach tree for instance, it is not uncommon to have the roots of the tree frozen with the trunk and branches entirely unharmed. Again there may be a narrow collar injured near the crown of the tree where possibly water had settled and frozen. In both cases it is common to find the tree leafing out in the spring, possibly growing two or three inches, and suddenly about the middle or last of June the leaves begin to wilt; and the tree dies in a comparatively short time. This occurs often and since it happens so late in the season the grower is disinclined to believe that it could be winter injury for he thinks the tree could not leaf out at all had it been frozen. When we consider that the tree can start into growth from the reserve food stored in the branches entirely independent of the roots, the results will become clear.

Again it is common to have the peach injured by having the small twigs and branches frozen while the trunk of the tree and roots are entirely uninjured. In this case we usually find the twigs drying up and having a purplish black color and new growth will start out from adventitious buds near the base of the trunk or crown of the tree. It is also quite common to have the peach break out with gum looking much like the work of the fruit bark beetle.

When we cut into the wood of a tree injured by freezing we find a peculiar blackish appearance of the heart-wood but so long as the tissues just under the bark remains green or even a brownish green the tree will usually recover and its injury will be scarcely noticed. It is common in some sections of the West to find apple and pear trees that are entirely black-hearted from freezing and yet there is apparently no injury to the trees.

In the apple we usually do not find the buds alone killed but if injury occurs at all the twigs and fruit spurs also are killed. It is well to note that the winter injury of apple trees is more common than is usually supposed. The writer has seen many mature Baldwin apple trees killed outright through northern Ohio as a result of a severe winter. This is usually, if not always, preceded by a weakening of the tree from scale or other causes. In the more northern climates such as New England the writer believes that a large amount of the Black rot canker which is so common throughout the orchards follows as a result of winter injury to the limbs.

Causes of Winter Injury.

No one cause alone is usually assigned for the winter injury of our trees although if the temperature falls very low and continues for some time that cause alone would cause injury

or death of the trees. It is well known that dormant buds will usually stand a temperature of ten degrees below without serious loss. On the other hand a temperature of five degrees below zero has been known to kill the fruit buds of the peach over an extended area. So it is evident that some factors other than cold are commonly associated with the injury.

One of the common causes associated with this trouble is the immaturity of the wood and buds when they go into winter. This imperfect ripening of the wood and buds may be brought about by late cultivation or by warm, wet weather late in the fall which causes the trees to keep growing until winter sets in and consequently they are sappy and unable to resist the cold. Improper pruning or fertilizing the trees may bring about the same condition.

A large peach grower near Toledo once said that he had lost hundreds of trees one year as a direct result of continuing cultivation too long. This is why the growers stop cultivation early in summer and either sow a cover crop or let the weeds take the land, thus pumping the water out of the soil and enabling the trees to mature the wood.

On the other hand it is surprising sometimes to see the amount of late cultivation some orchards will stand without injury. In the fall of 1913 (Oct.) the writer visited an orchard which is located north of the central part of New Hampshire, on the foot hills of the White Mountains. Here he found the owner cultivating his young orchard and had been keeping the cultivator going throughout the season. The following winter was unusually severe and yet practically no injury

occurred to these young apple and cherry trees.

From our observation in some districts we are inclined to believe that severe winds are an important factor in causing injury to the fruit buds, even without severe freezing weather. This would indicate that an effective wind-break would be a great advantage to an exposed peach orchard.

The warm weather which occurs in January or February and starts the buds into growth which is so common in Ohio is a serious handicap to the peach grower. For after that time severe weather plays havoc with the tender fruits.

Method of Protection.

Various methods of protection have been tried with varying degrees of success. Probably the first consideration is to have a soil sufficiently light as to bring about early maturity of the plants. Here we have contrary evidence, as some other factors such as slight differences in elevation and exposure may prove of greater importance than the nature of the soil.

To keep the trees in a healthy condition is always essential. At the Ohio Experiment Station a test was made some few years ago on the advantages of cultivating peach trees. It was there plainly evident that the trees which made the best growth and were in the best condition were the least subject to winter injury.

Possibly the method which is best known is that of white washing the trees in autumn to prevent their absorbing heat on sunny days. Dr. Whitten of the Missouri Experiment Station, first showed the advantage of this method of protection. He found that the whitened trees came into bloom a day later than the unwhitewashed

ones. On the whitened trees eighty per cent of the flowers had perfect essential organs. They remained in bloom longer, and set fruit better than those that were not whitened. During other seasons the whitened buds were much later in blooming than in the one reported above. The cost is not great, not exceeding ten cents per tree.

Laying down the trees themselves by cutting the roots on one side and then covering the tree with soil or other material is sometimes practiced in cold climates with success. However, for Ohio conditions it is doubtful if these methods would prove satisfactory. Suitable locations, careful cultural conditions, and hardy varieties are the prime essentials for safety.

Hardy Varieties.

It is highly desirable that hardy and disease resistant strains of our fruits be obtained, and it is to this end that some of the investigators are now bending their efforts. The breeding of hardy fruits opens a fertile field to the plant breeder who has the patience to wait on results.

Among the hardiest peaches that are grown commercially are the Hill's Chili and the Champion. Others which are found quite hardy are the Greensboro, Carman, Belle of Georgia, and Elberta. The Early Richmond, Montmorency and Morello cherries are the most widely planted of the sour cherries. Of the grapes the Green Mountain, Worden, and Brighton are hardy.



THE JOY OF SUCH A GARDEN!

THE CONSERVATION OF FARM PRODUCTS

PROF. L. M. MONTGOMERY

Ohio State University

“A PENNY saved is a penny earned,” saith an old adage, which presents a fundamental economic truth concerning the agricultural interests of this day and age. Conservation is a primary need of this generation. Indeed this century will probably be noted for its progress in conservation as the past was noted for the rapid development of our economic resources.

Each year witnesses a large increase of population, particularly in our cities, without a corresponding increase in the area productive of food supplies. Hence we are compelled to adopt some measures which will enable us to increase our supplies from areas already under tillage.

Our large manufacturing establishments have long since verified the fact that the utilization of fragments and seemingly waste materials in the form of by-products, represents the greater source of income. The meat packing industry utilizes all of the seemingly waste parts of the slaughtered animals by working them up into glue, fertilizer and other by-products with such efficiency as practically to pay operating expenses for the whole establishment.

A certain seed firm in this state saves the pulp from the tomatoes grown for seed purposes and converts it into puree and catsup stock with such profit as to practically leave the seed as clear gain.

The great agricultural problem of today is to dispose satisfactorily of the more perishable products of the farm, orchard or garden at a profit and without waste. It frequently happens that as a result of a temporary over-supply

or lack of proper distributive methods and facilities or financial stringency, many products of the farm and garden, more or less perishable in character, are allowed annually to go to waste or are sold at prices far below the actual cost of production. This is especially true of many fruits and vegetables.

The proper utilization of such materials is economically necessary for four reasons; (1) to prevent their absolute loss as food products; (2) to preserve them for consumption at a later period when fresh materials may not be available; (3) to prevent the depreciation in prices incident to overstocked markets; and (4) to secure the enhanced value of the more highly finished products.

Wilful waste is criminal and waste reasons: (1) to prevent their absolute methods for the preservation of surplus food materials is scarcely excusable. We are morally bound to make the best possible utilization of every particle of raw food products in order that we may ourselves have an abundance and that the consuming public may be well supplied.

While the extensive development of rapid transportation service has been the means of bringing the products of the far South and the great Pacific Coast to our markets during that period when the supply of fresh food products is naturally at low ebb, the fact remains that we could do much to carry over from our normal growing season many products which are not obtainable fresh during the winter months or else only at relatively high prices. Such products may be made to satisfy every demand so far as quality

is concerned and will enter into competition with the so-called fresh products from the southern states.

Furthermore, some means of utilization for the surplus products is necessary in order that the surplus may not compete in the market with the supply necessary to meet the normal demand. Such competition not only lessens the market price of the better grade of goods, but decreases their consumption as well. The policy of utilizing the surplus will only become vitally valuable as regards the decreasing of competition when a considerable number of individuals adopt such a policy.

Finally, the practice of conservation methods with respect to our perishable food stuffs will not only lessen competition during the growing season, but will return the dividends incident to the manufacture of more highly finished food products. A bushel of corn may be worth fifty cents, but the hominy or corn flakes derived from it will be worth many times as much.

The question naturally arises as to what may be done to utilize our surplus products at a profit. And upon the solution of this question rests the future development of this phase of agricultural effort. There are a number of ways in which producers may accomplish the desired ends through the methods, practices and ultimate results must vary with individual enterprises. For the extensive producer of fruits or vegetables the methods necessarily assume commercial proportions of some magnitude and will be subject to the usual factory competition. For the small producer of the same materials a somewhat more restricted outlet is available, but with greater advantage from a competitive standpoint.

The most important means of con-

serving food products is by the processes of canning. Canning consists in the preservation of food products in air tight receptacles by means of heat. The receptacles will consist of either glass jars or tin cans of suitable sizes varying according to the concentration of the material and the relative value of the finished product. For the large producer of a normal product the tin cans are most largely used and preferable, while for the more fancy product on a small scale for either home consumption or select market, the glass jars are especially suitable.

For the orchardist, canning opens a line of enterprise destined to accomplish large results in the profitable management of a successful fruit plantation. It will enable him to save and utilize large quantities of the less desirable grades at a profit, besides relieving his market of just so much quickly perishable material which must compete more or less disastrously with the better grades.

Pie peaches, pears, and cherries, and apples for sauce put up in gallon cans find a ready market at satisfactory prices if of good quality, while the smaller cans of all forms of tree and small fruits are finding an increasing market.

Other lines of operation for the producer of fruit will consist in the manufacture of cider and cider vinegar, fruit jellies, butters, jams and preserves and the evaporation of a variety of fruits. The producer of vegetables may utilize many of his surplus materials by canning such products as asparagus, beans, beets, corn, egg plant, kraut, peppers, pumpkin, tomatoes and spinach, as well as in manufacturing a large variety of pickle which find a very ready market in all our large cities.

NURSERY AND ORCHARD INSPECTION

EUGENE W. MENDENHALL

Deputy Nursery and Orchard Inspector, Columbus, Ohio

THE cause that brought about the nursery and orchard inspection laws in Ohio was an outbreak of San Jose scale found in Clermont County in the fall of 1894. Later another outbreak was discovered on Catawba Island in one of the largest peach growing sections in the state.

The San Jose scale was discovered in the United States as early as 1870

No doubt the nurseries have a great deal to do in the spreading of this destructive little insect as they ship their stock from one place to another without inspection. However, at the present time with the rigid laws and careful inspections very little danger comes from the nurseries in this regard.

The first Ohio Nursery and Orchard Inspection Law went into effect in



UNLOADING FOREIGN NURSERY STOCK FOR INSPECTION.

and was supposed to have been transmitted to California on nursery stock from its native home in Northern China. Professor Comstock, an eminent entomologist, found it in California in 1873 and described it as a new species of scale. It can now be found in nearly every state in the Union and nearly every state has its own laws regulating the shipping of nursery stock.

1900, and was placed under the supervision of the Board of Control of the Ohio Agricultural Experiment Station at Wooster. In 1902 the law was amended and then transferred to the Ohio Board of Agriculture at Columbus.

Anyone who wishes to sell nursery stock must first make application to the Bureau of Nursery and Orchard Inspection. This must be done by the

first of July of each year. The inspections are made between the first of July and the fifteenth of September.

The nursery stock is all inspected at this time of the year while the stock is growing in the field and if diseases or insect pests are found the nursery men have to treat their stock before packing time. If the stock is seriously infected with dangerous insect pests, the stock is at once destroyed.

When the stock is found apparently free from disease and insect pests and when the nursery man has complied with the regulations of the Bureau of Nursery and Orchard Inspection, he is granted a certificate of inspection. The fee for inspection depends on the amount or number of acres of nursery stock. Reinspections are made whenever necessary and especially at packing time when the stock is dug and placed on the packing grounds.

All nursery men are required to have a suitable place to fumigate their stock whenever necessary. Some states

require all stock to be fumigated before entering the state. The fumigating room must be air tight. The best way to test one of these houses is to make a smudge, and see if any smoke escapes when the house is closed up.

It is estimated that the loss to American agriculture by insect and fungous diseases is \$500,000,000 annually. By proper treatment fully 75% of this great loss can be prevented. This has been demonstrated by our practical fruit growers. It is true that nearly all our dangerous plant diseases and insect pests as the San Jose scale and apple worm were imported from Europe and other foreign countries. Many of the troubles in our horticultural activities can be traced to the introduction of the pests on nursery stock. While spraying is the one great means to success for the farmer and fruit grower, careful inspection of the nursery stock on the part of the state is equally as great an advantage and precaution to the prospective buyer.



STATE INSPECTION HAS MADE FRUIT GROWING MORE PROFITABLE.

NOTES ON THE DUSTING OF APPLES

P. B. WILTBERGER, '15

EXPERIMENTS in the dusting of apples for the control of the codling moth have been carried on at different places and by numerous individuals since 1904. The results have varied widely. Until 1913 the material used for dusting had been merely powdered lime and powdered or flowers of sulphur. In the experiments carried on in 1913 by F. M. Blodgett of Cornell University, and in later experiments by other workers, a form of sulphur

foot pipe, 4 inches in diameter. In dusting all that the operator has to do is to keep moving the long arm up and down so as to distribute the dust evenly over the foliage and fruit. So simple is the operation that a good operator can dust from 30 to 40 acres of orchard per day. A dust crew usually consists of only two men, a driver and an operator.

Dusting has some advantages over spraying. The foremost of these is



THE "DUSTER" IN ACTION.

has been used of which 95% will pass through a 200 mesh sieve. This form of sulphur and finely powdered arsenate of lead were mixed in the proportion of four parts of the sulphur to one part of the arsenate of lead. This mixture is placed in the reservoir of the dusting machine.

The Dusting Machine.

The dusting machine is an ingenious contrivance in itself. It consists of a suction fan with a reservoir and operated by a small gasoline engine. This fan blows the dust through a 10-12

the time element. As stated above, a good dusting crew can cover from 30 to 40 acres per day, whereas a good spraying crew can only cover from 4 to 6 acres a day. As the "calyx cup" spray is the most important treatment in the control of the codling moth, and must be applied within five days or less when the calyx cup is open, one can immediately see the advantage of the "dust" over the "spray" to the commercial orchardist.

Moreover, the cost of application of the dust is considerably less than that

of the spray. While in the cost of the material itself the dust is the more expensive of the two, this is more than balanced by the cost of labor in applying the spray. Given the same amount of time, one dusting crew can cover as many acres of orchard per day as five spraying crews can.

A third advantage comes under the cost of application with distance from available water supply and steep hill-sides as limiting factors. Dusting is far superior to spraying when these points are considered other things being equal. For instance, in a hilly country, where the orchard is on a more or less steep hillside, these factors have an important effect upon the cost of application. What about the number of horses required to pull

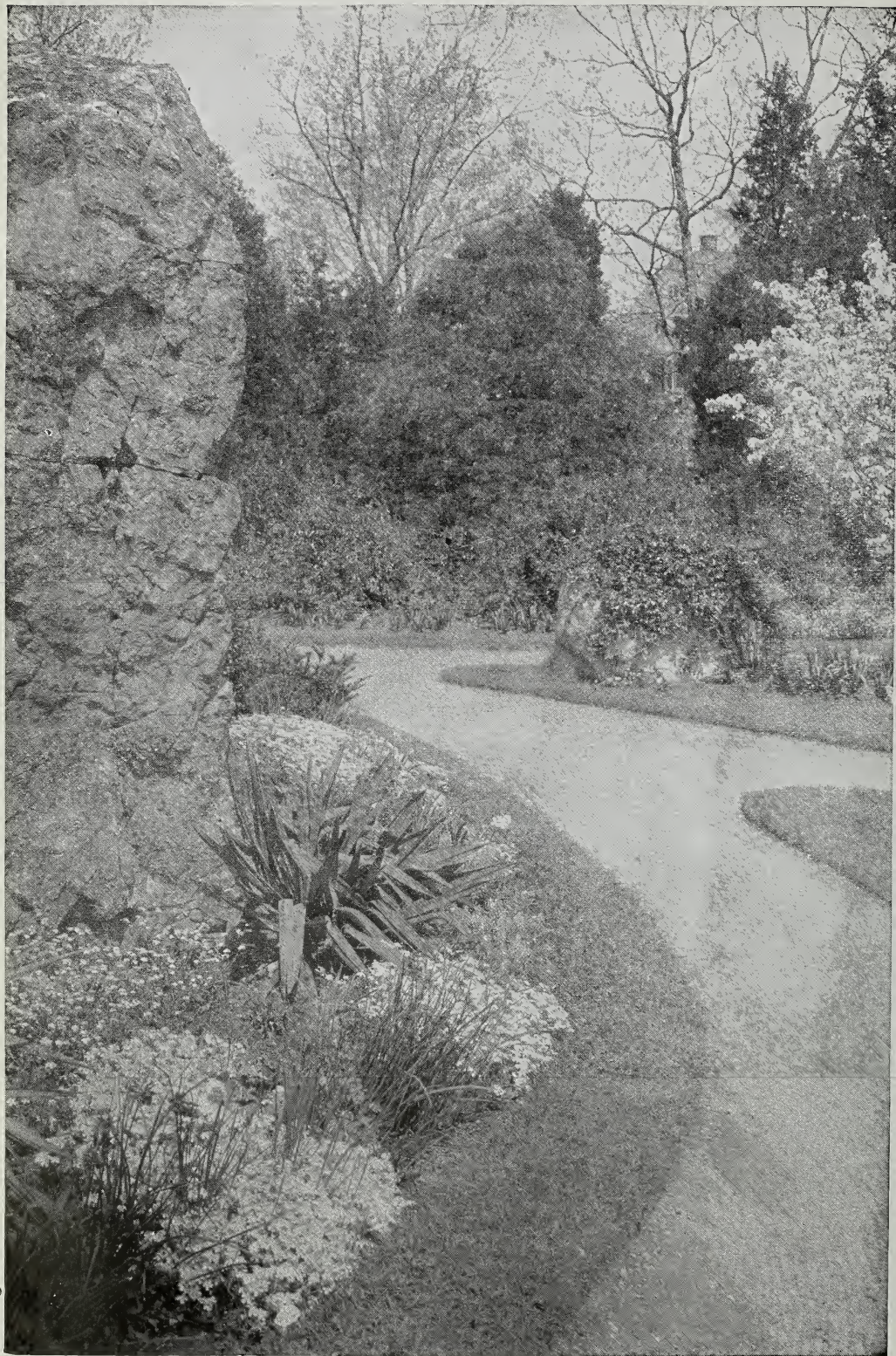
a dusting outfit over them? Then again, the water supply under these conditions is apt to be quite a distance from the orchard, and the cost of hauling water up-hill is so great as to be almost prohibitive, while the cost of hauling the dusting material is almost negligible.

The Results.

As stated above, up to 1913, the results had been of a varied nature, but since then different experiments have shown that the dusting of the apple for the control of the codling moth is effective and economical, and may in the near future supplant spraying for this insect entirely. There still remains, however, a great amount of exploitation to be done with the process of "dusting."



SUCCESSFUL ORCHARDING IMPLIES FREEDOM FROM DISEASE AND INSECTS.



THE FIRST SPRING FLOWERS IN A CHARMING GARDEN.

APPLE SOILS

W. H. MOSIER, '15

IN selecting a location for an apple orchard there are many factors to be taken into consideration such as climate, air drainage, insects and diseases, transportation facilities, markets and varieties. The soil as a rule receives but minor consideration, the supposition being that any moderately fertile soil will produce apples. This condition of affairs is beginning to change, and will continue to do so at a more rapid rate as competition becomes sharper in the industry and a more discriminating trade begins to demand that each variety be grown and marketed in the best possible form.

All soil will not produce farm crops of the same chemical composition and market value, and it stands to reason that apples are affected in the same manner. For instance an orchardist grows a certain variety to perfection on one part of his farm, while scions from these trees will not produce fruit of as good quality when grown on another part of the farm under identical conditions as far as climate, rainfall, air drainage, cultural practices and fertilization are concerned. There are many such cases on record and the only feasible explanation is that the soil is the controlling factor. Unfortunately very little experimental work has been done along this line, and for this reason the evidence at hand is very limited.

Another instance of soil influence is seen in the behavior of the Baldwin apple. This is essentially a winter variety and grows best north of a line drawn in a westerly direction from New York City while south of this line it becomes a fall variety. However, if the variety be grown upon a soil some-

what heavier than the ideal, it will have a tendency to retard tree growth and fruit maturity, the retardation being probably due to the lower specific heat of the heavier soil. Thus the climatic factor is offset to some extent; and, although the difference is not great enough to compensate for any great climatic fluctuation, it seems to illustrate the importance of the soil factor.

Of the thirteen soil provinces represented in the United States, seven are to be found east of the Mississippi River. Of these seven soil provinces, the Appalachian Mountain probably ranks first in apple production with the Glacial and Loessal a close second, while the River Flood Plains and the Atlantic and Gulf Coast Plain produce no apples worth mentioning. However, the five apple producing provinces are divided into many soil series, and the series in turn are divided into soil types, so that in dealing with the production of a certain variety of apples, we are in reality dealing with the smallest unit of soil classification; namely, the soil type. As good apple culture consists of growing each variety at its best, we will consider the subject briefly from this standpoint.

Baldwin Soils. It has been found that soils grading from medium to semi-light fulfill the requirements of the Baldwin. The surface soil should contain an appreciable amount of sand which should not all be of the same grade, and in general it might be said that the sand should be of the finer sorts. The subsoil should be light enough to admit of good drainage, but at the same time clayey enough to retain a good supply of moisture. The

ideal is to be found in a heavy fine sandy loam or light mellow loam, underlaid by light plastic clay loam or heavy silt loam. This is one of the safe criteria to follow in selecting soils for this variety. The color of the surface soil should be dark, owing to the presence of organic matter, and if this is not the case, the deficiency should be corrected at once by the growth of some leguminous crop and the turning under of the same.

Rhode Island Greening. For this variety a surface soil of heavy silty loam or light silty clay loam underlaid by a silty clay loam is the best. These soils will hold enough moisture to be classed as moist soils. The soil should be moderately rich in organic matter.

Northern Spy. This variety is very exacting in its soil requirements. The fact that the Northern Spy is a red apple makes it imperative that the color be well developed, and that the skin be free from a greasy tendency. This calls for a delicate soil adjustment for the heavier types on which the variety would grow would produce fruit with greasy skins, and poorly colored. On the sandy soils that would produce good color and clear skins, the fruit would not possess the proper texture and flavor. In view of these facts it is probable that a medium loam underlaid by a heavy loam or a light clay loam would suit the variety.

Grimes Golden. The soil requirements of the Grimes is similar to that of the R. I. Greening. In latitude it is best to plant this variety where the Greening tends to become a fall apple. It should never be planted on a light

or thin soil, and likewise never on a stiff soil. The tree seems to mature best on a well drained, fertile, moist soil. Air drainage is very essential for this variety and in locating an orchard this phase must be considered.

Rome Beauty. This variety seems to have about the same climatic range as the Grimes and grows to perfection in the hills along the Ohio River. Here we find the DeKalb series of the Appalachian province, the region being very hilly and the soil thin and of a rather friable clay loam. The soil should be rich enough to promote good tree growth, but at the same time light enough to give the bright color to the fruit for which it is noted.

Ben Davis and Gano. These varieties can probably be grown over a wider range of territory than any others. They are grown from Pennsylvania to Alabama, and westward to California. Their popularity comes from their storage and shipping qualities and not from their superior flavor. They will succeed on nearly any kind of soil, but as the trees are thrifty growers and the fruit highly colored, a rather light soil is the best. They are probably grown to perfection in the Ozark region of Missouri.

It can be seen from this brief discussion that different varieties are very exacting in their soil requirements. Therefore, let us hope that the time will come when the principal fruit regions of the United States will be mapped out, both as to the soil types which they contain and as to the varieties of apples that do best in a given region.

MARCH.

Ah, passing few are they who speak,
Wild, stormy month! in praise of thee;
Yet though thy winds are loud and bleak,
Thou art a welcome month to me.

For thou, to northern lands, again
The glad and glorious sun dost bring,
And thou hast joined the gentle train
And wear'st the gentle name of Spring.
—Bryant.

GROWING CURRANTS PROFITABLY

C. L. BURKHOLDER, '15

THE currant has often been called a "miserable fruit," but about seven years ago the price of currants went up to a point where it is now one of the most profitable of fruits. There are several possible reasons for this, the main ones being the almost total disappearance of the back yard currant patch, the San Jose scale, and the currant worm. The San Jose scale

planting does not seem to be keeping pace with the dying out of the small garden patches. It seems possible that in the future the bulk of the currant crop will be raised by the man who makes a study of fruit growing, or at least pays more than ordinary attention to this line of work.

The currant is one of the easiest plants to propagate. A fresh green



THE CURRANT IS FOUND TO BE ONE OF THE MOST PROFITABLE OF OUR SMALL FRUITS.

particularly in the past few years has attacked and destroyed almost all the little patches of currants that were not scientifically handled and it was these little patches of currants in the garden and back of the rhubarb plot that had been supplying the bulk of the crop.

There has been a great increase in the plantings of this fruit among the progressive fruit men in the last six or seven years, but even this increased

cutting placed in the ground in the spring and given a little cultivation and attention during the summer will at the beginning of the next year have a fine root system developed, and be ready to plant in the permanent bed. These young plants are taken from the cutting bed and planted in rows which are about six feet apart. The plants are usually placed about four feet apart in the row. If they are supplied

with plenty of fertility they will very soon take up all this room. The distance between rows allows a team and spray outfit to drive straddle of a row very nicely. A long tiling spade is used to do the planting. The spade is shoved straight into the ground, then tipped forward a little and the cutting dropped down back of the spade; it is then pulled out and the cutting firmly packed in place with the foot.

The currant plant begins to bear by the third year. Very little trimming needs to be done during the first four or five years, as the young currant plant like a young tree will produce large perfect fruit even though the bush be a little thick. At the end of that time some of the oldest wood must be removed each year; how much depends on the fertility of the soil and upon the variety of currants. If the soil is a rich black sand, in which the currant thrives best, they will not have to be cut quite so strongly. If too, the currant is of the Cherry Currant type they will not need to be pruned so heavily. It is usually a safe plan to remove one-third of the old wood each year, as it is the old canes that produce the small, inferior fruit.

Some of our best orchard men at the present time use the currant profitably as a filler in young orchards. The bushes may be planted with or between the rows of trees. In many cases the regular program of using early bearing varieties of trees is also used. The currant prefers a little shade; the currants will hang on the vine for several weeks after they are mature, provided they are not directly exposed to the rays of the sun all the time. The writer has seen at least one fruit grower picking currants in a twenty year old plum orchard, two weeks after the ordinary season for currant picking

was past. Moreover these currants brought \$1 per bushel more than those which were picked in season. These currants were grown on the same ground which a little later on matured a fine crop of plums. They did not interfere with cultivation in the least and were taking up ground that would have otherwise been wasted.

The writer has kept records of 34 currant bushes. The fruit was picked on each bush separately each year and the returns recorded. Using this data as a basis, a currant bush ought to produce 51 quarts during the first 15 years of its life, allowing for complete failures of 2 of the 15 years. At 8c per quart, which is considerably lower than they have been bringing the last five years, this would make the gross receipts average 27c per bushel for each of the 15 years, making average gross receipts of \$490 per acre. There are some other interesting figures with reference to these 34 currant bushes. In the year 1912 at the age of eight years they produced six bushels of currants which brought gross receipts amounting to \$18. The space covered by these bushes amounted to 810 square feet. Accordingly \$36 worth would be produced on 1620 square feet of this patch. This is the same area that is ordinarily covered by an apple tree. This row of 34 bushes was no different than any other rows in this block, and in the year of 1912 this particular block produced at the rate of \$970 per acre. The expense of picking, packing and marketing of currants is higher than that of most any other fruit, amounting to about 34% of the gross receipts. But even after deducting this amount it is found that in the last seven years the currant stands at the top of the list when compared for instance with plums, cherries and apples.

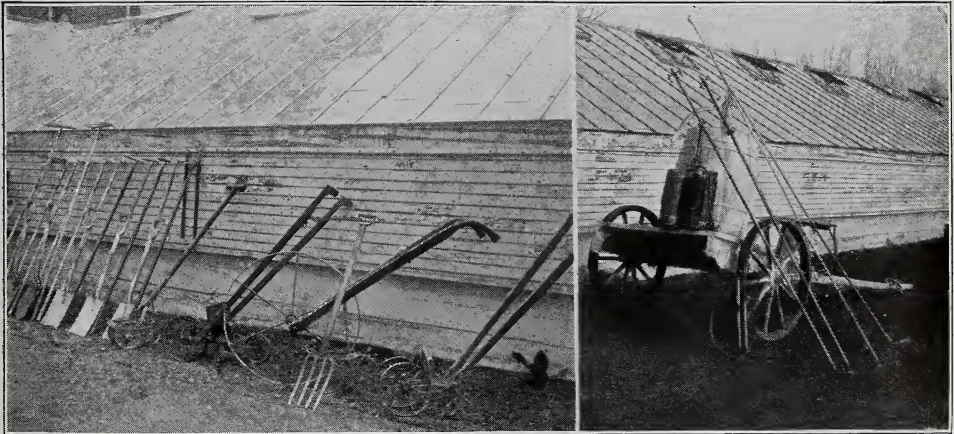
APHIDS OF THE APPLE

D. L. HARKINS, '15

APHIDS or plant lice are hemipterous insects belonging to the family Aphididae, distinguished by their peculiar mode of reproduction. The winter as a rule is spent in the egg stage. In the spring a wingless female hatches out, which, without the intervention of males, produces living young, also wingless females, in enormous numbers. One of these forms may bring forth 50 or more young which within

Wooly Aphis, *Schizoneura lanigera*; the Green Apple Aphis, *Aphis pomi*; the Rosy or Purple Apple Aphis, *Aphis sorbi*; and the European Grain Aphis, *Siphocoryne avenae*. To all of these except the first the apple is the primary host. Until recently the first three mentioned were included under one name *Aphis mali*.

The Wooly Aphis is the most serious pest. It attacks both the roots and top,



THE FIRST EQUIPMENT OF THE DEPARTMENT OF HORTICULTURE, OHIO STATE UNIVERSITY.

a week are capable of repeating the same function. These wingless forms remain on the parent plant, but early in the summer they produce a winged female which migrates to other plants and produces asexually the wingless forms again. When cold weather comes a wingless female and a winged or wingless male are produced which are sexual and upon fertilization the female produces the eggs which hatch in the spring.

Four species parasitize the apple to an economic extent. They are the

feeding on tender bark. Wherever the bark is punctured, a scabby abnormal growth appears and on the roots lumpy galls and swelling occur. These roots often die and rot away leaving the tree with very little support. This is especially common on nursery stock. This louse has a rusty or purplish brown body, the winged forms ranging from greenish brown to black. A flocculent cottony secretion more conspicuous on the wingless forms betrays their presence on the tree.

In this species the winged forms late

in summer migrate to the elm where sexual forms are produced and eggs laid. In early summer they migrate back to the apple though wingless forms carry over the cycle through winter on this tree also.

Prevention is the best remedy for this pest. Nursery trees infested with it should not be planted. If they are, a course spray of 1-15 kerosene emulsion of a tobacco compound such as "Black Leaf 40" should be applied to both roots and tops. For older trees, sprays of these same materials may be applied to the tops just before buds open in spring and in August before the fall migration. To treat the roots of older trees, expose them and spray thoroughly with the same mixture as the top.

The Green Apple Aphis, *Aphis pomi*, lays its eggs on the apple tree on twigs and at the base of buds and the insects of an apple colony spend their entire life on apple trees. The wingless forms are yellowish green while the winged forms are darker and have the head and parts of the thorax brown or black. They attack the leaves causing them to curl so that the tip touches the stem on the under side. Spraying for them in this condition is obviously useless. The same remedies apply as in case of the Woolly Aphis, especial attention being paid to the early spring

spray just before the buds open.

The Rosy or Purple Apple Aphis, *Aphis sorbi*, is distinguished by a pink color of different shades and a slight covering of powdery material. This species attacks the leaves causing them to curl as with *Aphis pomi* and also sucks the juices from the young fruits causing the distorted freak forms sometimes seen. In midsummer they migrate to an unknown host but return in fall and lay their eggs on the trunk and large branches.

The European Grain Aphis, *Aphis avenae*, is marked with alternating stripes of light and dark green across the body. It lays its eggs on the apple but in summer the winged forms migrate to grasses such as oats, barley, wheat, etc., and start colonies there. In late summer they return to the apple and finish the life cycle. They may be treated the same as the Green Apple Aphis.

Tobacco compounds such as "Black Leaf 40" are the most popular and effective remedies at present. Kerosene emulsion is just as effective but inconvenient to use. These lice on account of their great numbers cause much injury to the tree. They suck out the sap and lower its vitality thus rendering it non-resistant to other pests and diseases. Sprays for them are always well repaid.

"For I planted these orchard trees myself
On hillside slopes that belong to me;
Where visions are wide and winds are free
That all the round year might come to my
shelf.

And there on my shelves the white winter
through
Pippin and Pearmain, Rambo, and Spy,
Greening and Swaar and Spitzenburghs lie
With memories tense of sun and dew.

They bring me the days when the ground was turned,
When the trees were pruned and tilled and sprayed,
When the sprouts were cut and grafts were made,
When fields were cleaned and the brush-wood piles burned."

—L. H. Bailey.



THE BEAUTY OF THE HARDY GARDEN IS EVER VARYING; EVER APPEALING.

THE FLOWER GARDEN IN THE COUNTRY

C. R. RUNYAN, '15

THE type of flower garden one usually sees in the rural districts is very disappointing. In many cases we see a lot of exotic plants which while perfectly proper in their native habitat, are sadly out of place in this climate. The most common offense against the art of gardening is a canna bed edged with coleus and placed in the middle of the lawn. This is usually the centerpiece and is surrounded by other beds of tender plants. There is nothing wrong with these plants in themselves but they are here entirely out of place.

The reason for this condition is obvious. This style makes a show but what a cheap tawdry show it is! Aside from this the plants must be lifted every year or new ones purchased. Another great objection is that for seven months out of the twelve the lawn is marred by brown patches of earth which are extremely unsightly.

How can we remedy this? Hardy plants will solve the problem for any color which exists in the tender plants can be obtained in the hardy plant. The great advantage of the hardy plant lies in the fact that the annual digging up is eliminated.

After it is decided to have a garden the usual plan is to sit down with a pile of seed catalogues at one's elbow and select everything one thinks he would like and can afford. The planning is done after the seeds arrive. Whenever such a plan is followed only confusion can result.

The garden should be planned during the winter evenings when there is nothing else to do. In planning the garden there are certain basic principles which may be laid down. The

laws may be grouped into two divisions: namely, (1) location; (2) characteristics of the flowers.

Under location will come (a) locations of beds or borders (b) location of the individual species. It is evident that the latter will depend upon the characteristics of the flowers. The position of the flowers as a whole is a serious question and different conditions must be taken into consideration. The usual plan is to plant in borders at the boundaries of the area devoted to the garden leaving an open space in the center for a lawn.

Under the characteristics of the flower will come (a) blooming period, (b) color (c) size. The blooming period is an important factor, both as to the season of flowering and the length of the blooming period. Considerable attention must be given to this factor. Color almost explains itself although there are a few simple rules which will probably aid the beginner in making the right combination. The following combinations will be found useful; blue and yellow or orange, light purple and yellow or orange. Red will combine satisfactorily with but few shades. A very bright red or a very rich dark red with either a yellow or a very light blue will not offend the eye but care must be used in combining red with other colors. Any of the above colors may of course be combined with white. Size is another important factor. In general the taller growing plants should be placed at the rear and the smaller ones in front, although here and there a few tall growing plants may spring up from among the shorter ones.

With these points in mind we are

ready to plan the border. A hardy border throughout the season is undesirable as well as impossible. Select if possible early spring, late spring, summer and fall blooming plants. Take into consideration size and color, so that if there is a delay in the flowering period there will be no clashing of colors.

The following plants should be found satisfactory in this climate:

Border I: Early spring, Narcissus; May, Darwin Tulips and early Peonies; June, late Peonies; July, Lillium elegans; August, Lillium henryi and superbum; September, Lillium superbum; October-November, Chrysanthemums, edge with trailing myrtle.

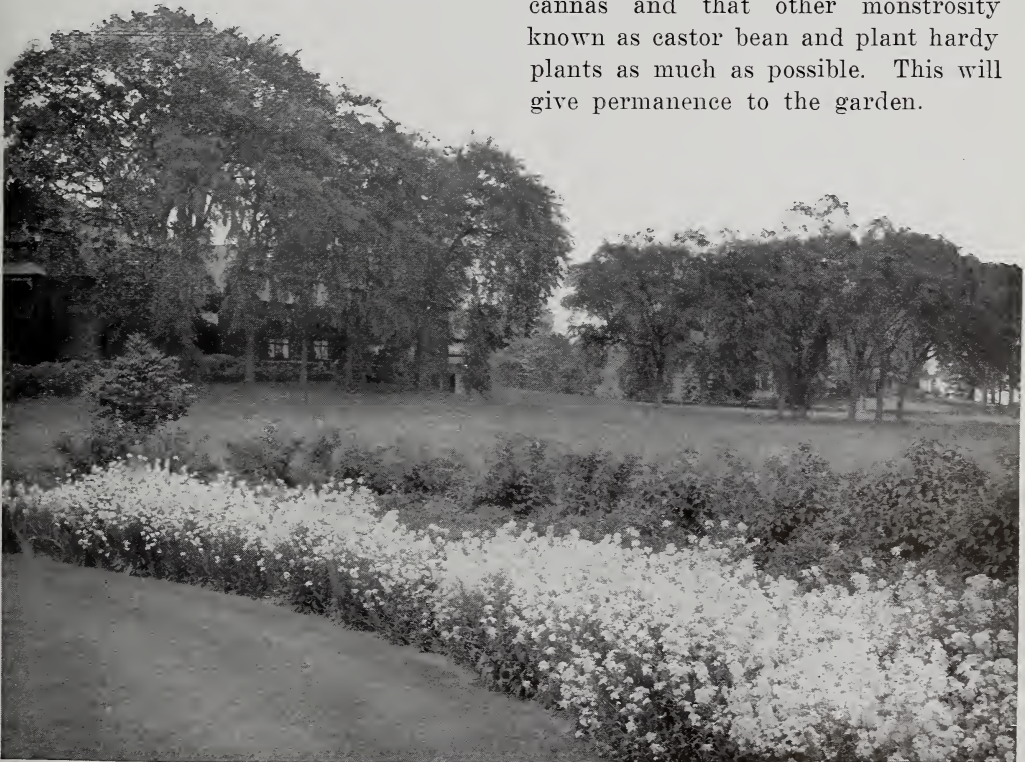
Border II: Early spring, Bridgid anemone; May, Bleedingheart; June, Peach-leaved bellflower and coreopsis; the latter till frost; July and August, Japanese bellflower; September-Octo-

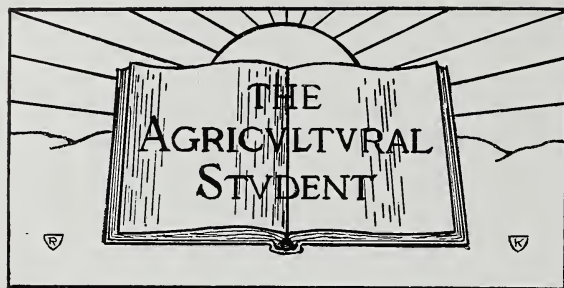
ber, Japanese Anemome; October-November, Michlemas daisies.

Border III: Early spring and edging, Iris cristatus; May, Catchfly; June, Lillium candidum; July, Hollyhocks; July-September, Miss Lingard Phlox; September-November, Single Chrysanthemums.

While most stress is laid on hardy plants, this does not mean that we should do away with annuals. The many varieties of poppies will give a gorgeous display at a small outlay. Snap dragons while perennials are rather tender and it is better to treat them as annuals. A plan which worked especially well in some gardens is to plant a row or two of a few kinds of annuals and to cultivate them just as vegetables. This is a constant source for cut flowers.

The point to be emphasized is to dispense with tropical plants such as cannas and that other monstrosity known as castor bean and plant hardy plants as much as possible. This will give permanence to the garden.





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COLUMBUS, OHIO, MARCH, 1915.

EDITORIAL

The apple market for the year 1914-1915 will go down in history as one of the worst that

WILL THERE BE AN growers and
OVER-PRODUCTION? dealers have
ever known,

but does not this condition of affairs indicate that a stage in orcharding has been reached when we are confronted with serious over-production? The serious minded apple man will not admit it except locally perhaps, but rather he believes our trouble lies in poor distribution, lack of advertising and consequently under consumption.

The apple crop of the year 1914 is estimated to be 66,000,000 barrels, but of this amount not over one-third, or 22,000,000 barrels will be classed as commercial pack, according to the

American Apple Growers' Association. Contrary to all expectations the export trade up to this date has been greater than for the same period of last year. This means that 20 per cent of the commercial pack will go abroad, leaving 17,600,000 barrels for home consumption, or but a little over a peck for each individual.

These figures indicate that the present depression in the apple market is abnormal at least in so far as the better grades of apples are concerned.

But what of the future? Statistics do not show that there is likely to be a serious over production as the new orchards coming into bearing do not greatly exceed the acreage that is going into decay. There is hardly enough increase in production to keep pace

with the increase in population at the present time. And it is safe to predict that the difference between production and the increase in population will be increased by immigration.

It is no doubt true that there is an overproduction of boxed apples in the West, but this condition is believed to be due to faulty distribution. But, however this may be, low prices for the past three seasons have had the effect of putting a stop to orchard exploitations. During this boom period, now happily brought to a close, large areas of unsuitable land were planted to orchards. Many of these trees were bound to come into unprofitable bearing, but their owners have hung on with the hopes of better returns. Now that their eyes are open to the general situation many of these orchards are being neglected, and consequently it will not be long before many acres of land now in orchard will be devoted to their legitimate use—that of growing farm crops.

The apparently temporary overproduction in some parts of the West will soon adjust itself and the lack of proper distribution has become a national topic. So it is likely that our system of marketing will be improved greatly in the near future.

All know that years of bumper crops in all sections are unusual and that periods of business depression do not follow each other in rapid succession. Now that a halt has been called to the promiscuous planting of orchards, that a rapid increase in population appears certain, and that the best minds of the country are studying systems of distributions and of marketing, one can only conclude that the future of the legitimate apple grower is brighter than ever before.

W. PADDOCK.

Under the provisions of the Smith-Lever Act, Ohio will receive 4.26 per cent. of the total **AGRICULTURAL** federal funds **EXTENSION.** available for agricultural extension

purposes; the amount being determined for each state in accordance with the ratio of the total rural population of the state to the total rural population of the United States. This year Ohio receives \$10,000 from the federal funds; next year the state will receive \$35,557; \$56,857 in 1917 with an additional increase of \$21,297 each year until 1922 when the amount of \$184,684 will become available for extension purposes in Ohio. Of course, the bill provides that every dollar that the state receives over the annual allowance of \$10,000 a like amount must be appropriated from the funds of the state or secured by other means. Granting this, the sum of \$184,684 which the college of agriculture will receive in 1922 and every year afterwards, the amount will be greater than the total appropriations for the entire agricultural college at the present time.

The original bill before it went into the hands of a committee provided that 75 per cent. of the funds should be devoted entirely to agricultural demonstration purposes. While this clause was lost in the committee, the interpretation of the bill fortunately has remained the same for 60 per cent. of the funds were used for this purpose during the past year. Fertilizer meetings, spraying demonstrations, etc., are included in this aside from the regular work of the extension schools.

Politics can in no wise enter into consideration in the disposal of the federal funds for all appropriations will cease when extension work is transferred to any other institution of the state other

than the agricultural college. Every provision tends toward the expenditure of money for educational purposes and for the provision of facilities whereby the rural population will receive the direct benefit of these funds. The demonstration work which the Smith-Lever Act is designed to promote has already met with considerable success in the states where it has been started, but the additional funds will greatly increase its efficiency. In order that the greatest possibilities may be obtained farm clubs or rural organizations should be formed to communicate with the county agriculturist or agricultural college. In this way the greatest benefits can be secured.

¶ ¶ ¶ ¶

Since the outbreak of the present European war many benevolent societies and individuals have been actively engaged in relieving the harrassed Belgians in their present circumstances. Shiploads of food and clothing have been sent to relieve the suffering; nurses and doctors, to render medical attention to the sick and wounded. All this has been done without malice or enmity towards the warring nations—all feel that it is the required duty to mankind. Such action is the expression of the American people and can be properly termed **THE AMERICAN SPIRIT**.

While this action aids the Belgians very much in their present difficulties, the real problem of existence will come after the war has closed or the battle ground transferred to some other nation. Practically the entire country of Belgium has been overrun; its fine horses taken as prizes of war; its meat animals taken to feed a ravishing army and its populace forced into military

service. Practically all its natural resources will have been carried away, its government destroyed and nothing left but devastation and ruin. To render aid will be necessary but difficult and expensive. In view of this fact, **THE AMERICAN SPIRIT** again asserts itself and proposes to bring the homeless, unfortunate, and others to America and provide them homes where they again can practice their cultural arts and sciences without molestation. Such a plan, if properly carried out would not only relieve the Belgians but would also benefit America's agriculture and horticulture. The raising of the famous Belgian horses, the production of seeds, flowers and horticultural necessities which ordinarily come from Belgium can be produced with equal efficiency in our country with the Belgians as husbandmen. Is not this a plan which deserves the attention and help of every American?

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February 15 marked the date when the supervision and management of all the county agriculturists of Ohio come under the direction of the **THE COUNTY AGRICULTURIST**. agricultural college.

The work of the county agriculturist is now recognized as one of great importance. The field is wide, but as yet not clearly defined. In many counties, however, lines of work of permanent value are being considered and followed consistently. Farmers in counties where county agriculturists are stationed have quickly recognized the value of agricultural advice. Although an agriculturist does not pose as an expert yet his college training, supplemented by practical farm experience and sound judgment enables him to offer counsel on many occasions. His per-

sonality should be such that his ability for service will increase as he mingles with the farmers of his county. His consultation in regard to cropping systems, liming, fertilizing and tile draining, the management of orchards and livestock and various farm activities should enable him to develop his ability as a leader for his ultimate success will depend largely upon this personal factor.

He must command the respect and confidence of all, if he would attain their hearty co-operation. In his efforts for agricultural and social betterment this co-operation is essential. Through the local press, the public schools and farmers' clubs, the county agriculturist will be able to reach great numbers effectively, and his work will be measured by the social as well as the financial advancement of this country.

¶ ¶ ¶ ¶

When fertility of the soil declines, when crops fail, when clouds of discontent seem to grow heavier, **STAY IN OHIO.** or when extraordinary stories of unusual money-making possibilities come from other sections of the country, some farmers get a "Western or Southern bee" and oft times leave Ohio to seek their fortunes in other states. They are often attracted by unscrupulous advertisements which reveal wonderful crop production, beautiful home surroundings, pleasant climate; in fact, perfect facilities for every activity. It is not uncommon, if not the rule, for those people who do go "West" or "South" to return to Ohio finding that no better opportunities can be found elsewhere. Probably no other section of country offers so many diversions of occupations as does the state of Ohio. No other state offers such excellent market facilities and it is certain that

no others offer such rare opportunities in productive soils which can be obtained at a reasonable price. Consider any agricultural feature in any other state and Ohio will offer its equal. Formerly a popular slogan was "Young man, go West and grow up with the country." Let's make it—"Learn agriculture and stay in Ohio."

¶ ¶ ¶ ¶

As a fruit producing state Ohio has a location as regards climate and markets unexcelled by any other state in the Union. Has Ohio, however, taken advantage of her possibilities? Let us look at a few facts. In 1914 Ohio had an apple crop estimated at 13,300,000 bushels, the largest crop produced at any time during the past 15 years. This crop was only 6 per cent of that produced in the entire country, and amounts to $2\frac{1}{2}$ bushels to each individual in the state. The price received by the grower was not up to the average price received in the other large fruit producing states. Visitors at the Apple Show held in connection with the recent Mid-Winter Exposition were surprised at the fine displays of Ohio apples. Many pronounced the show to be the best ever held east of the Rocky Mountains. The apples were undoubtedly as fine as any apples could be, both in quality and appearance.

As regards climate Ohio has two unexcelled fruit regions. The one includes the northern section of the state which is tempered by Lake Erie and hence is sure of fairly regular crops of all kinds of fruits. The other includes the southern and southeastern parts of the state; the elevated or hill sections which are somewhat tempered by the Ohio River. This latter section is one

As regards climate Ohio has two unexcelled fruit regions. The one includes the northern section of the state which is tempered by Lake Erie and hence is sure of fairly regular crops of all kinds of fruits. The other includes the southern and southeastern parts of the state; the elevated or hill sections which are somewhat tempered by the Ohio River. This latter section is one

of cheap land and in many cases of fertile soil. It has been the experience of growers in this region that the fruit grown on the hills is of a color superior to the fruit grown on lower land, while the trees do not attain such great size, and still bear prolifically. There is a great deal of second growth timber in this region which will never become of commercial importance, but the soil is virgin. Here then lie the great possibilities of fruit growing in the future as the advent of machinery has made this land unsuited for the growing of crops other than fruits.

While it is true that the conditions of the past year will not warrant any great expansion in the growing of apples and peaches in the immediate future, nevertheless, there are great opportunities in the state for the growing of nuts and all kinds of small fruits, of which the greater part of the supply of both are now shipped in from other states. Every year carloads of canned fruits of all kinds are shipped in from other states and consumed by the people of Ohio. Every year there are shipped into this state hundreds of cars of peaches and apples. Why? It is not due so much to a lower price as to a higher standard of excellence in the quality of the fruit of the same grade that is shipped in. On the other hand, Ohio is well located for the shipping of fruit to adjacent states, particularly to the south. In the immediate future, then, Ohio fruit growers and prospective growers should plan, not so much for an expansion of the tree fruits, as for an improvement in the quality and standard of those fruits now grown, and the canning and preserving of all fruit that falls below a set standard, together with an expansion in the growing of small fruits.

A salesman once said that he saw a good country-woman, wishing to buy a package of beet

HORTICULTURE AND GENERAL FARMING.

seed, obliged to beg ten cents from her husband. The fol-

lowing summer the same salesman happened to dine with this family. Pickled beets were so much relished by the visitor that they became the topic of conversation. The farmer commenting on the subject declared, "Besides having beets for our own use, we have sold over three dollars worth and we sowed only one package of seed." "Yes," replied the visitor, "and I remember seeing your wife begging the money with which to buy the seed."

This simple incident illustrates how the growing of vegetables and fruits for the home is too often left to the women folk of the farm. In this age of specialization there is a tendency for the general farmer to devote his entire attention to his "special" crops and live stock and neglect the phases of horticulture that rightfully belong to him. Because of the nature of horticultural products the most desirable way for the farmer to get fruits and vegetables is to grow them on his own farm.

It is a sad sight to see country folks exchanging baskets of eggs for wilted vegetables that could easily have been grown on the farm, but even worse than this is the fact that many farmers do without many of the common vegetables. This deplorable condition is even worse in the case of our common fruits. The statement, "grow more corn and buy fruit," would seem at first thought to be good theory, but as a matter of fact it fails to work in practice and as a result the family is de-

nied many of the natural products of the farm.

A great variety of vegetables can be grown on any farm and there are few farms in Ohio that will not produce fruit of some kind. Many farms have suitable orchard sites with natural frost protection, while less favorable ones can be protected by the use of orchard heaters. The time is past, however, when good fruit can be grown without considerable knowledge and attention on the part of the husbandman and this probably accounts for the fact that many farmers have given up in despair and left the old orchard to the ravages of insect pests and the family in want of fruit.

Horticulture on the general farm should be given a place in the farm scheme in order that other work will not crowd it to the background. If given equal rank with other minor operations of the farm the necessary attention and work will not only become a pleasurable diversion for the farmer himself, but as a result the health and happiness of the family will be increased by the fruits and vegetables produced. The resulting profits will be found to be as great and often greater than those from the same amount of labor in the fields.

A well kept fruit garden as well as some attention to the growth of flow-

ers and shrubbery adds greatly to the appearance of the home and has an aesthetic value that can never be measured in dollars and cents. There is probably nothing that will do more to make the country home attractive than the proper growing of well selected plants.

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In presenting this number we wish to extend our appreciation to all who have given **ACKNOWLEDGMENTS.** their time and attention in the preparation of this issue and to all who contributed by writing special articles.

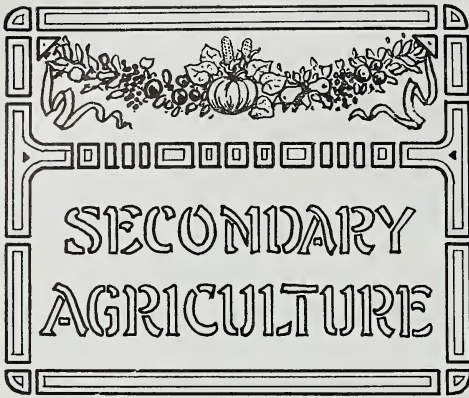
We are especially indebted to our associate editor, Lloyd P. Foster, a senior in the horticultural department, for his services in working out the details of the number and for his excellent suggestions as to subject matter. To him belongs the credit for the success of the issue.

We wish also to make especial mention of The International Harvester Company for the use of the cut which appears on the frontispiece; likewise, The Field Illustrated, for the cut which appears on page 501, to The Cornell Countryman for the cut appearing on the contents page, and to the Biltmore Nursery for the flower garden scenes.

GOOD FRIENDS.

Good friends are better than fine gold!
I find it sweet as I grow old
To prove in you this happy truth,
To which I held in early youth,
And having proved shall ever hold:
Good friends are better than fine gold!

—A. J. Grannis.



With the melting of the last great snow and a few successive days of warm sunshine, March reminds us that another dormant period is nearly completed. Our souls are stirred, and our hearts beat anew with the hopes of spring. What school boy or girl does not wish to escape civilization's confinement at the first signs of spring and long to stroll in the open fields, the woods, and along the streams and "list to Nature's Teachings?" It is only natural that the child mind should be attracted to nature on such great days when millions of plants and many animals awake from their slumbers and again show signs of life. The very fact that all the signs of life are not easily seen at such an early date makes nature study all the more interesting to children when their interest is once aroused. Teachers should not only encourage this interest by taking their pupils on excursions to the fields and woods, but should take advantage of this natural interest and teach some of the fundamental facts in nature when they will be best received. Much can be done at this time to stimulate observation and as a result Nature will teach many of its own lessons. Children of any age may be encouraged to note the first swelling of the buds

and the names of the trees showing the greatest bud swelling can be taught at the same time. The same observational method may be continued in noting the first wild flowers and the early leafing of the common trees. The interest may be greatly increased by placing the names of the first plants and their observers on the blackboard in the order in which they are found by the children.

Nature study at this time when the child is naturally interested affords an opportunity of teaching some of the fundamentals of agriculture. Close observation of plant life in early spring is and always will be inspiring and fascinating and may be indulged in, with pleasure, from early youth to old age. It should be encouraged in the high schools giving more detail to the science of plants, thus awakening in the pupils a desire to unravel the mysteries of plant life and at the same time stimulating a desire for more knowledge of agricultural subjects in general.

"We are in danger today in portions of our country of developing an American peasantry below the standard of American life. The country needs trained, loyal men to meet this danger. The whole world is looking to the American farmer just now and the American city is finding out its dependence upon the American farmer as never before."—G. W. Fiske of Oberlin, before the Winter course students.

DON'T WORRY!

A little care is very good,
 But too much worry—kills!
 A "bump" is better now and then
 Than constant fretting about when
 And where we'll meet our ills.

—Lynn C. Doyle.

HORTICULTURE IN THE SCHOOLS

Agriculture has come to be a required study in many of our common schools, and since it is new many teachers are finding the work perplexing. But no one should be discouraged because of this fact for a similar state of affairs prevailed among the agricultural colleges for a number of years and they are only finding themselves now after thirty years of effort. It is to be expected that progress in the schools will be much more rapid since there is now a wealth of material to draw from.

When the subject of agriculture is mentioned, one's mind usually turns toward the usual farm with its usual complement of animal and farm crops. It is but natural that the beginning in agricultural instruction should follow the same trend. But the teaching in any phase of agriculture without illustrative material soon becomes somewhat like a course in manual training without a work bench and tools or an attempt to teach domestic science without laboratory material.

Farm crops and animals may be difficult to secure in many places. It would appear, therefore, that some of the various phases of horticulture might well be used to advantage. Usually a little garden space may be found about the school yard and there are wonderful possibilities in window boxes. With limited facilities one may learn much about seeds, their purity, germinating power, the embryo and plantlet, the preparation of soil, planting seed, cultivation, weeding, insects, diseases and the handling of the matured crop. As has been suggested the possibilities are extensive when one begins to investigate the subject, so one should resist the temptation to cover too much ground.

Fruits and vegetables may always be had in season and much enthusiasm may be aroused in describing and judging them. Forms for descriptions and for judging may always be had by applying at the agricultural college.

It will be found after a trial that good judgment and accurate observation are required in describing fruits or vegetables so that these powers are developed quite as much as when botany or zoology are studied. Then the judging of fruits or vegetables is an art which can only be developed by practice. This phase of the work is chiefly valuable in that it stimulates a desire to know more so it can be carried to extremes. A small prize for the best scores adds much to the zest of the work.

WENDELL PADDOCK.

HOME ECONOMICS IN THE PUBLIC SCHOOLS.

A department of home economics in the public schools of today is being recognized as one of the most important subjects in the education of young women. Women of today are beginning to realize their own capabilities, are looking for a broader education and a greater development; and this development is being sought more and more outside the home, whereas formerly it was sought and found within the home itself.

Old theories and traditions of women's work, education and sphere of influence do not coincide with the necessities and limitations of today. The decline of the domestic or home industry and the rise of the factory system have greatly modified the internal organization of the home. The fact that woman is less a slave to her home should not in any way make her less a homemaker. The criticism that the

girl of today cannot keep house or adorn a home in the capacity of mother, as did her mother or her grandmother before her, is one which the public schools have in their power to eliminate and this through thoroughly practical as well as scientific courses in the various phases of home economics.

Home economics is doing a great deal for girls in every class. There are the trade schools for the working girl teaching her to become a seamstress; a tailorress; a dressmaker; a caterer; or a cook. There are the schools which give training to girls who wish to study the professional phase of home economics, as for example the profession of a dietitian, and institutional manager or a teacher. These schools also train the girl in the profession of house-keeping and give her an appreciation of the art of homemaking. Some people have rather narrow views as to the value of home economics training. I have heard remarks like these: "Who wants a daughter to learn how to be a cook, or a seamstress, or to know how to wash and iron? She shall never have to do it. My daughter can learn at home all she needs to know about cooking and sewing." Such remarks come from people who fail to realize that the best managed homes are those whose managers have a thorough knowledge of home economics; they know the value of a piece of material and combination of colors for harmonious decorations; also know how to plan a well balanced meal, as to nutritive value and moderate cost.

When professional homemaking has come into its own, and a good many homes are now managed by women who put intelligent thought into their work, the schools will not need to duplicate a girl's home training. Most homes of today do not teach the pro-

cesses of food preparation and garment making, yet expect the girl to know **how** when she settles down into a home of her own.

The rapidity with which home economics shall be universally taught in the public schools is handicapped largely by the financial inability on the part of school boards and unfortunately, too, by deplorable indifference in certain communities. But right here credit must be given to the Farmer's Institutes all over the country and especially in the state of Ohio for the great impetus which they give to the subject. This may be seen in two ways; first, in nearly every institute held in Ohio this year there has been home economics speakers; second, the exhibits in bread, cakes, pies, canning and needle-work have been promoted by the farmers' wives and keen interest in these exhibits has seemed to be not so much the interest of competition, as the interest of achievement. This surely points toward the future and final success of teaching home economics in our public schools.

MARGARET FARNAM,

Instructor of Home Economics,
Ohio University, Athens, Ohio.

RURAL SCHOOL ORGANIZATION.

The great need of the country schools is organization. No system at all is disastrous. System with sense is good. Too much system is as bad as none. System brings order out of chaos, makes a time and a place for everything, and enables a school to run as correctly and smoothly as a well-oiled machine but without its mechanical hardness.

We make way for the man who organizes. He is energy plus. He pushes business with brains. Things emanate

from his own brain and heart. His best asset is hard work.

Organization requires imagination. The men who lead the world's business have been dreamers first. They worked hard, thought hard and expected much. They trusted in their own powers. It is the old story "Brains win."

System creates confidence. Make it a live thing. Then it means efficiency. There can be no economy where there is no efficiency.

Organization does not require genius, but talent. Train talent, organize opportunities. Organization makes and uses opportunities. Tact is skill or adroitness in doing or saying exactly what is required by circumstances. In school life, it is a pre-eminent quality; in organization it also occupies a chief place. The tactician placates angry feelings; tells when to say nothing and do nothing; discovers what is masterly activity and masterly inaction. It springs out of good will to others.

Organization is the co-operative relation of patrons, pupils, powers and pedagogues. System is the machinery of business. A real system is automatic. Every one in the organization ought to be familiar with it in general and his own work in particular. If a system fails to work, the men at the top are usually to blame. A good organization runs itself. When it fails to do so, it is ready for the scrap-heap.

Organization is a modern policy. The organized man is a power; he moves shoulder to shoulder with his

brother. The unorganized man is merely part of a mob with no chart or compass to guide him.

Organization is the spirit of progress and the spirit of progress is the greatest asset a business or a teacher can have. The more people we can work with and for, the bigger and better we are. The success of the teacher depends largely upon his ability to organize the social forces of his community into a co-operative unity. We are living in an age of organization; commercial and industrial enterprises, cities and men are thriving upon it. Men get together to discuss things, to better conditions. They are doing it in a spirit of progress.

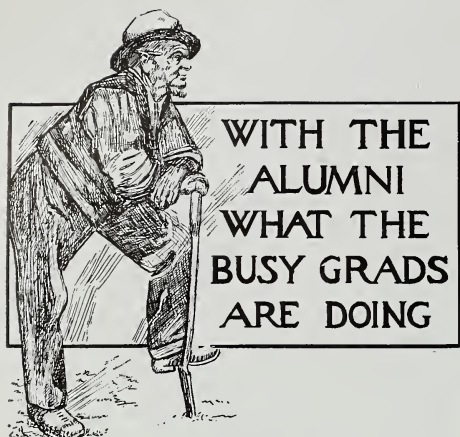
Reciprocity, mutuality, co-operation are combined in this spirit and the greatest of these is co-operation. Co-operation is self-preservation. The strength of unity is indisputable. The energy expended on a "tug of war" is not constructive. It is like one man pumping water out of a basin while another pumps it back. There are two chief reasons for lack of co-operation: one is, that men do not agree upon what is best to be done; the other is, that selfish motives deceive men into thinking that they can get more by going alone. Organization is the remedy. Interdependence is the great fundamental law of the universe. Organization increases knowledge, gives greater opportunities for service, spells length of days, and binds men into a lasting fraternity.

S. A. HARBOUR,

State Department of Education.

And the Spring arose in the garden fair,
Like the spirit of love felt everywhere;
And each flower and herb on earth's dark breast
Rose from the dreams of its wintry rest.

—Percy Bysshe Shelley.



Ernest J. Riggs, now the agriculturist for Washington County, was born in Gallia County, near Gallipolis, Ohio, in 1873. After attending Gallia Academy for two years, he entered Ohio State University in 1890 and was graduated in 1895 with the degree of Bachelor of Science in Horticulture. The following year he took a business course completing it in the spring of 1896 and then went to the farm to begin life as a farmer. Later he took a post-graduate course at Cornell University, completing the work in '97, receiving a degree of Master of Science in Horticulture and Forestry. Soon after the completion of his post-graduate work, he was given an opportunity to teach in the New Hampshire State Agricultural College, where he took up the work as assistant professor in horticulture. He resigned in the spring of 1898 in order to continue his practical work in farming. Until 1907 he continued to farm, spending a great amount of his time during the winter in county institute work throughout the state.

In 1907 he was appointed chief inspector of the Dairy and Food department in which work he continued for three years. In 1910 he became connected with The Ohio Agricultural Ex-

periment Station as assistant horticulturist and continued in this work until the autumn of 1914 when he was chosen as agricultural agent for Washington County, having charge of the county experimental farm.

In taking up farm work after graduation from Ohio State he at once began to apply his horticultural knowledge in the production of apples and has continued to plant trees and grow



apples without interruption. At the present time he owns and exercises the management over 240 acres of land in southern Ohio completely occupied with apple trees, which have been planted under his direction. The largest crop ever produced in any one year was in

1912 when 4700 barrels were harvested.

He has been President of the Ohio State Horticultural Society for the past few years and has been responsible in a great degree for the success of the annual apple show which the society holds. They have been among the best shows in the eastern United States.

Concerning the apple business Mr. Riggs says: "The production of apples during the past few years has not been very profitable, but the temporary depression has not discouraged me from having great faith in the future of this great industry as a profitable business, and as the trees increase in size and produce larger crops, bringing at the same time greater responsibilities, I will soon need to devote my entire time to this work."

Orma J. Smith was graduated from the horticultural department of Ohio State University in 1907. Immediately after graduation he accepted a position as instructor in horticulture in the Iowa State College at Ames, Iowa. He remained there for two years receiving his Master's degree in 1909. After leaving the Iowa State College he went to Idaho and engaged in practical horticultural work at Nampa. In 1910 he accepted the position of professor of biology and chemistry at the college of Idaho at Caldwell where he is at the present time.

Paul Barnes, '11, has charge of a large orchard at Glendale near Cincinnati, Ohio.

D. R. Vanatta, '10, is now county agriculturist for Hamilton County. His office is in Woodward High school, Cincinnati, where he directs the teaching of agriculture in that school and at the same time conducts boys' and girls' contests, corn shows and other agricultural activities throughout the county. During Farmers' Week he brought

about 50 boys who are interested in agriculture to Columbus where they spent the week in attending the lectures and visiting about the campus.

Sam Higginbottom, '10, and Don G. Griffin, '14, who with their wives started for the Ewing Christian College at Allahabad, India, were on the steamship Lusitana, which ran through the German blockade around England by hoisting the American flag. They reached England safely, however, and sailed for India, February 17th.

Ralph Kinney, '12, formerly at Kentucky University, is now located at the Kansas Agricultural College, Manhattan, Kansas. He is engaged in crops work.

W. F. Bruce, '11, who had been teaching in a secondary school at Dawson, Minn., is now farming at Delta, Ohio.

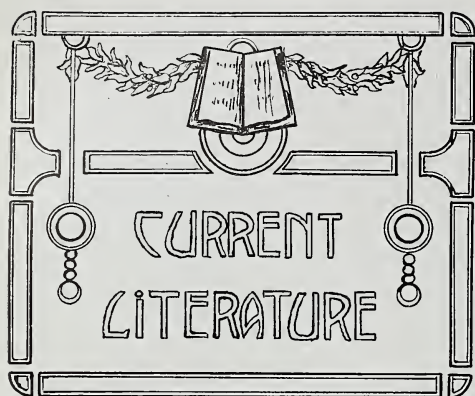
Harry Simmermacher, ex-'15, who completed his work at the end of the first semester is teaching high school agriculture at Leroy, Ohio.

Harry C. Hyatt, '11, formerly engaged in landscape gardening work in Los Angeles, California, is now teacher of agriculture and horticulture in Union Polytechnic school at Venice, California. He has charge of a demonstration farm of 29 acres which is devoted principally to landscape gardening.

R. W. Jordon, '14, is manager of a large corporation which has been organized recently for commercial gardening on a tract of muck land near East Orwell, Ohio. The headquarters of the firm are at Cleveland.

J. M. Rogers, '12, controls the management of a large plantation on the Isle of Pines. The plantation is owned by Columbus people.

Carl F. Oberholman, '12, is head of the landscape gardening work in the Massachusetts Agricultural College at Amherst, Mass.



“First Lessons in Dairying” by H. E. Van Norman, Professor of Dairy Husbandry, Pennsylvania State College, is a book designed for practical use and as an elementary text book for colleges. It takes up the handling and shipping of milk, methods of cooling, and in fact most all of the problems that confront the average dairyman. Anyone engaged in dairying would find the book valuable. 100 pages, illustrated. Net 50c. Orange Judd Company, New York.

“Management and Breeding of Horses” by M. W. Harper of Cornell University, is a book which deals with the feeding, judging, breeding and management of horses. The history and description of each of the breeds is presented in a most practical manner. The book is based upon the experience of the writer both as a teacher and as manager of a large stable of horses. The book is so arranged as to be used as a text book. 500 pages, illustrated. Cloth, net, \$2.00. Orange Judd Company, New York.

“Fertilizers and Crops” by Dr. L. L. VanSlyke of the New York Experiment Station. This book is published mainly for class room work. It takes up the subject of “crop-feeding” from all

angles. The book is divided into four parts: first, the relation of plant food to soil fertility; second, the sources and composition of materials used as fertilizers; third, the kind of materials that should be used as fertilizer; and the last part deals with the use of fertilizer in the growing of individual crops. The book contains a great amount of valuable information with regard to the chemistry of plant feeding. 710 pages, illustrated. Cloth, net, \$2.50. Orange Judd Company, New York.

“York State Rural Problems” by L. H. Bailey, formerly Dean of Cornell University. The chapters of this book have grown out of the author’s personal experience, and have been to a large extent the working out of rural problems that have come to him for solution. While these discussions pertain primarily to questions of a local nature, they should be of interest to those studying the rural problems of other parts of the country. The discussions are the result of definite work and study when the various problems were up for consideration. 300 pages. Cloth, \$1.00. J. B. Lyon Company, Albany, N. Y.

“Practical Talks on Farm Engineering” by R. P. Clarkson, Professor of Engineering at Acadia University, is a treatise compiled from the author’s experience in advising farmers in these matters through the agricultural press. The sole aim is to present a text to farmers without technical language. Farm buildings, water supply, sewage disposal, tractors, gasoline engines, tile drainage, road building, and electrical appliances are subjects that receive most attention. 223 pages, illustrated. Cloth, \$1.00. Doubleday Page & Co., Garden City, N. J.

"Plant Breeding" by A. W. Gilbert of Cornell University, is a revised edition of the former work of L. H. Bailey on the same subject. In addition to many changes in the material, new subjects have been added such as mendelism, heredity, and recent application of the breeding of plants. The book is the last word on plant breeding. 474 pages, illustrated. Net, \$2.00. The Macmillan Co., New York.

"Unifying Rural Community Interests" is a compilation of a number of articles written by the leaders of the country life movement and edited by Henry Israel. The keynote of the entire work is that along with prosperity in the country there must be a corresponding increase of consciousness of social, moral and spiritual prosperity. The book should be a source of inspiration and help to the great mass of country people who feel that they must get together if the country is ever to come to its own. 125 pages. Price, \$1.00. Association Press, New York.

"The Principles of Fruit Growing" by L. H. Bailey, has just appeared in revised form and embodies the latest teachings on this important subject. The different planning of orchards, and fertilization are adequately described. 432 pages, illustrated. Net, \$1.75. The Macmillan Co., New York.

"Swine Husbandry," by F. D. Coburn, is a revised edition of his original treatise of the subject with additions on the effects of cold upon fattening swine, and on feeding for fat and lean. The author sets forth the ideas of the most practical and successful swine raisers. The characteristics and rela-

tive merits of the various breeds are discussed, followed by a detailed consideration of the methods in the care and feeding of both breeding and fattening swine, and some of the most common diseases of the same. 310 pages, illustrated. Cloth, \$1.50. Orange Judd Co., New York.

"Principles and Practices of Poultry Culture" by John H. Robinson. Realizing that poultry culture is a combination of art and craft the author has given the technical operations and sciences which must be applied to successful poultry culture whether the operator contemplates the maintenance of a flock of a few hundred fowls or whether he intends to operate on a commercial scale. Feeds, rations, incubation, egg production, and marketing are treated with equal importance as that of the prevention and treatment of diseases, application and principles of breeding and types, breeds, and varieties of fowls. 610 pages, 570 illustrations. Net, \$2.50. Ginn & Co., Boston.

"Domesticated Animals and Plants" by Dean Eugene Davenport of the University of Illinois, is a book written for high and normal schools. It gives an interesting treatise upon the origin of our best known domesticated plants and animals, describes their life in the wild, explaining how they came to be domesticated, showing man's dependence upon their services, and stating the methods and principles of their further improvement. Selection, variation, environment and heredity are discussed with regard to their relation to improvement. 321 pages, illustrated. Cloth, \$1.25. Ginn and Co., Boston.



Closing exercises in which 136 students registered in the winter course in agriculture were presented with certificates, were held in the chapel Friday afternoon, February 26. J. F. Cunningham, editor of The Ohio Farmer was the principal speaker addressing the students by relating their duty to the cause of better agriculture and their relation to the agricultural college.

One hundred and sixteen students and members of the agricultural faculty with their wives attended a farewell banquet which was held in honor of the students on Thursday evening, February 24. Toasts were given by Prof. Alfred Vivian, Prof. C. S. Plumb, Dr. D. S. White dean of the College of Veterinary Medicine, Director C. E. Thorne of the Ohio Agricultural Experiment Station, and Dean Homer C. Price of the College of Agriculture.

Special trips were taken every Saturday during the course to different points of interest about the city such as the State Serum Farm, Gwinn Milling Company, Ohio Penitentiary, etc. This feature proved to be a decided success the attendance averaging over one hundred on each trip.

The daily four o'clock lectures which were held in the auditorium of the horticultural building were always well attended. Thirty-four lectures were

given by different agricultural men over the state each pertaining to some feature of agriculture in which the students were interested.

Probably the best feature provided for the benefit of the students was the Tuesday evening lectures given by members of the faculty of the College of Agriculture illustrated with lantern views taken by the lecturers on their trips abroad. Nearly the whole of Europe was covered by these lecturers with many scenes of agriculture and the lessons to be learned from their practices.

The youngest student was 17 years of age and the oldest 61. Most of the students came from Ohio, although Pennsylvania, Virginia, West Virginia, Iowa, and the Country of Mexico was represented. Twenty-one different vocations were represented. Six of the students were women all of whom live in the larger cities of Ohio. Mrs. Clara Drewery of Cincinnati, finding it inconvenient to attend classes at the fair grounds purchased an electric automobile. One of the students who gave his vocation as "gentleman of leisure" is a millionaire manufacturer from Youngstown, Ohio.

According to V. C. Smith, secretary of the college, this year's short course was the most successful ever held, the students taking greater interest than

ever before. Many expressed themselves very well satisfied with the course and spoke favorable of returning next year to enter in a longer course.

With the intention of perpetuating the memory of the pioneer horticulturist, "Johnny Appleseed," the John Chapman Memorial Association has been organized among the students in the department of horticulture. It will be remembered that John Chapman better known as "Johnny Appleseed" devoted almost fifty years of his life to the establishment of nurseries in the natural clearings along the streams in many parts of Ohio and Indiana about the time the early settlers were coming into these regions. According to investigators of the movement there is scarcely a section of Ohio which has not been benefited more or less directly by his efforts.

However, the grave which is near Ft. Wayne, Indiana, has never been marked although there have been small monuments erected to his memory in different parts of the state. It is the intention of the association to raise funds to mark his grave properly and probably erect a monument to his memory on the campus. The members are not limited to the students in horticulture but the co-operation and support of all persons interested is desired.

The members of the board of trustees are: H. E. Peebles, C. R. Gaiser, N. W. Glines, Brighton Slutes, M. C. Nauts, C. M. Ochs, B. D. Drain, C. E. Dutton, Prof. W. Paddock, and Prof. L. M. Montgomery.

The officers are: H. E. Peebles, President; M. C. Nauts, Vice President; N. W. Glines, Secretary; Miss Eva Smith, Librarian, and Carl E. Steeb, Treasurer.

Demonstrations of agricultural work at the county normal schools, secondary agricultural and horticultural work in the high schools of the state and evening lantern talks at district schools are some of the features of extension work which H. E. Eswine of the extension department has been carrying out during the past year.

The greater part of this work is done in connection with Frank W. Miller, Public School Commissioner, who arranges for a week's demonstration along agricultural lines at the county normal schools. One-half day of the week is devoted to some particular subject as corn, dairying, horticulture, etc. Facts about corn production, its value as an agricultural product and the development of our present varieties from inferior ones are the important points taken up. A representative ear is used to impress the main features to be kept in mind in judging corn.

In the subject of dairying the composition of whole milk is taken up and the uses of the various elements discussed. This shows the small amount of plant food removed in the sale of milk, cream and butter. Comparisons are made between the relative value of the three systems of agriculture, i. e., grain farming, livestock farming and dairying. A four-bottle Babcock tester is carried along for the purpose of emphasizing the necessity and use of such an instrument on the farms.

Pruning and spraying are the points touched in the subject of horticulture. A number of young trees are carried along and used for demonstration purposes especially pruning. Where weather conditions permit the class or school is taken to a near-by orchard for the pruning demonstration. Insects—especially troublesome to the

orchardist—receive their part in the discussion and some mounted specimens are shown. Life histories of the insects are traced and the methods of combating them.

The work in the high school is of a similar nature to that in the normal schools with the exception of its being more elementary. Demonstrations of milk testing, corn testing, etc., are carried out with the students of agriculture especially where there is no regular high school teacher assigned to the teaching of that branch.

Night lantern talks are given at some of the places where the work in agriculture is given during the day. However, these are given at any requested place especially if a series can be arranged for succeeding nights in a county or locality. A lantern and 50 slides are provided for this purpose of illustrating the best methods of improving neighborhood surroundings. The planting of home grounds, views of ideal schools, churches, farm buildings and some forms of objectionable advertising are shown. These meetings are generally given in the rural districts; they are well attended and the audiences are uniformly attentive and interested. The demand for these lectures are growing very much each year.

Mr. Eswine visited 95 schools last year, gave 141 lectures at these schools, delivered 24 night lantern talks and reached a total number of 14,736 persons.

Farmers' Week statistics showed that this year's attendance was 88 per cent. higher than last year. Three years ago, the attendance was 160, last year 770 and this year 1446. The oldest person enrolled was 88 years of age and the youngest 11. The average age was 39. Every county in the state ex-

cept Adams was represented and ten states besides Ohio sent students: these were Kentucky, Washington, Vermont, Michigan, New York, West Virginia, Missouri, Pennsylvania and Oklahoma. The registration cards showed that 77% of these in attendance live upon farms. The remainder were city farmers. It was also shown that 25 % of last year's attendance came again this year.

Pruning and spraying demonstrations will be held in farm orchards throughout the state during the coming season under the direction of the extension department of the university. Many orchardists, especially those men with the small orchards, have come to the point where they realize that the best results cannot be obtained without pruning and spraying. Some remarkable increases in both quantity and quality of fruit have been reported from the orchards that were thoroughly gone over last year. In order to aid those fruit growers to whom the work of pruning and spraying is new, the college of agriculture will make arrangements to send men into the field without charge to demonstrate and explain how this work should be done to get the best results. Those who wish to secure a demonstration should write to the Extension Department, Ohio State University.

According to the United States Senate Committee on Agriculture and Forestry, the farm mortgages in force in the United States aggregate more than two billion dollars showing conclusively that farmers desire credit. There are also two million dollars in the United States coffers seeking long time investment at low rates of interest, if the security is safe and stable. Rural credit legislation to be desirable must

be such as to bring together the farmers who want to borrow money and the persons having money to loan for long periods at low rates.

That the bill introduced recently in the legislature to abolish the Ohio Agricultural Commission and re-create the old unpaid Board of Agriculture will in no way affect the extension schools conducted by the University is now assured. These schools now in their sixth year have become increasingly popular with the farmers of Ohio so that a great deal of interest has been aroused by the proposal to decentralize the Agricultural Commission for fear that such sweeping changes might in some way affect the extension schools. According to Clark S. Wheeler, supervisor of extension schools, a number of petitions have been already filed for extension schools to be held next winter. This is due to the fact that the law limits these schools to one in each county and many communities fearing that another town in their county will also want a school are anxious to have their petitions filed first.

Recent statistics gathered concerning the universities of the country show that Ohio State stands fourth in the list to gain in attendance with an increase of 832. Ohio State is also eleventh on the list of total enrollment with nearly 5000 students.

In the college of agriculture Ohio State stands third with a total of 973 preceded only by Wisconsin and Cornell.

With the members of the legislature, and state officials and supreme judges visiting the campus, the pealing of the recently acquired chimes, alumni luncheon at the Ohio Union and talks by Governor Frank B Willis, ex-gov-

ernor James E Campbell, and President W. O. Thompson in the capel, University Day was observed February 22. The entire student regiment gave a review for the benefit of the visitors during the greater part of the forenoon while after luncheon the buildings were all thrown open for inspection to the public.

Farming is one of the most profitable fields in which the prisoners of the state of Ohio have been employed according to a report of the earnings of the state on 5023 acres, which shows that earnings for the past year were \$117,823. In no other branch of the state work, with the same investment, have the profits been so large. The report included the pay given the prisoners, veterinary services, forage and even the cost of the board of administration and the agricultural and horticultural departments. The largest sales were made in the slaughter of livestock while the sale of vegetables came second and milk third.

Crown Prince Maxie De Kol II owned by G. W. Rising of Fayette, Ohio, recently completed a 120-day record in which she gave 10,169 pounds of milk and 463.6 pounds of butter. This is the highest 120-day record for any breed.

Ohio's reputation for producing merit cows was again demonstrated recently when Murne Cowan, a cow owned by the Anna Dean Farm of Barberton, finished an official record on February 24, of 1,098 pounds of butter fat, surpassing May Rilma by about 25 pounds. An interesting feature concerned with this feat is that she was not expected to develop into an extraordinary producer and hence was not fed for this purpose during the first few months of the test.

DEDICATION OF THE NEW HORTICULTURE AND FORESTRY BUILDING.

Featured by addresses on "Horticulture, the Open Door to Opportunity," by S. A. Beach, of Iowa State College; "Outlook in Forestry," by F. W. Rane, State Forester of Massachusetts; "Development of Forestry and Horticulture at Ohio State University," by Prof. W. R. Lazenby, the new horticulture and forestry building was dedicated on February 5th.

Prof. S. A. Beach dwelt briefly on the need of special training along horticultural lines as a pre-requisite for success in the work. He also mentioned the unappreciated opportunities that were offered in the different lines of horticultural work.

"People are just beginning to realize the tremendous importance of the conservation of our forest supply and the urgent needs for the reforestation of many parts of our country," said F. W. Rane, a graduate of Ohio State University in '91, in speaking of the future on forestry work. "We must train the younger generations to take up the many problems which will present themselves in this work," he declared when speaking of the necessity of the new building.

Prof. W. R. Lazenby gave in brief a history of forestry and horticulture at Ohio State, telling how the departments were at one time united. Later, however, the need was felt for giving the students more of an opportunity to specialize; so in 1907 the department was divided. Naturally this meant more students, more instructors and more adequate equipment.

Prof. Wendell Paddock gave a brief description of the building, telling of its equipment and arrangement and

pointing out the fact that it is just the beginning of a new horticultural awakening from the standpoint of the study of the science. The building is so planned that it has features which are found in no other of its kind, namely, the cold storage, canning room, packing room, spray laboratory, forestry museum and timber testing laboratory. The use of these facilities will allow the students to obtain the best possible training along practical lines of work.

New greenhouses which are now in the process of erection will cover nearly an acre of ground and will be used as a laboratory in the study of vegetable gardening and floriculture.

As a result of the new building several new courses, one in floriculture and a professional course in landscape architecture, will be offered. Beginning next year a fifth year will be added to the course in forestry, leading to a Master's degree. Also, a new course, "Principles of Forestry," will be offered. This course is open to all students in the University, the purpose being to acquaint the student with a general view of the objects and purposes of forestry with the problems which it has to serve.

The new building will not only fulfill a long-felt want on the part of students and faculty, but will also have a great influence on Ohio's horticulture by providing a means whereby professional men can be put into the field for this great work. Ohio presents the greatest field for horticultural opportunities, for we have the climate, soil and proximity to the markets. In 1900 the income from fruits, nursery products, flowers and vegetables was \$20,256,000, which represents only a small portion of what it might be when more scientific and intensive methods are used.

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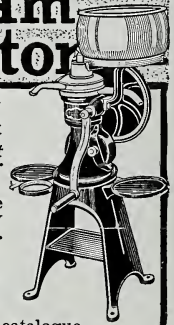
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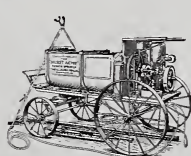
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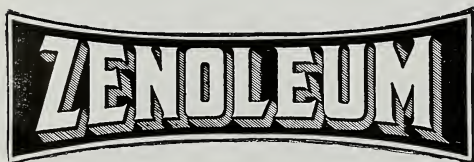
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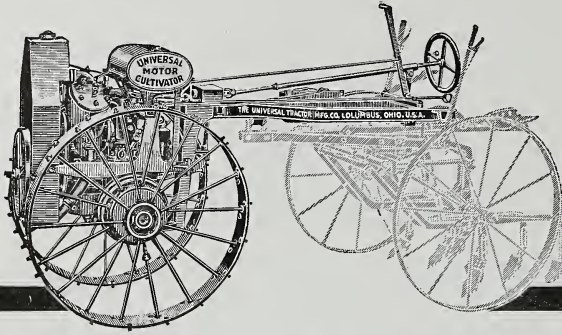
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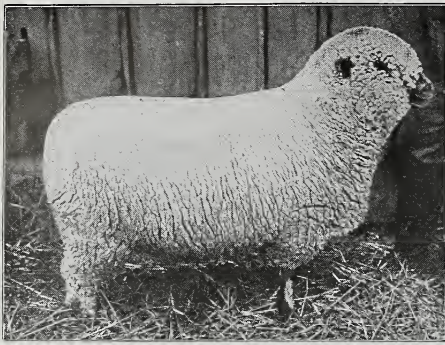
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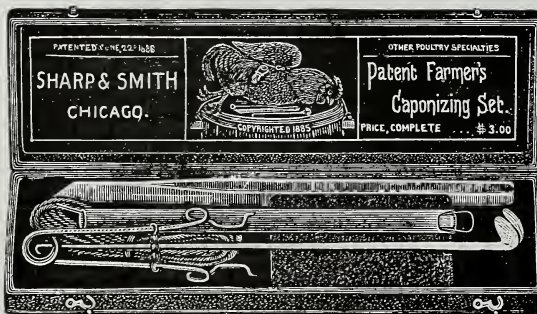
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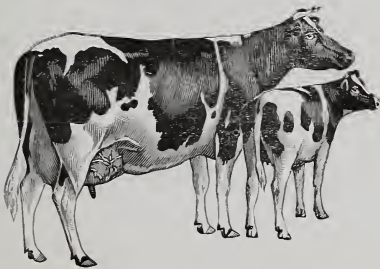
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17.90	3.15	41.27	3.18	22	30.98	3.15	25.95	3.16
18.29	3.15	41.94	3.19	23	31.48	3.18	26.38	3.18
18.70	3.17	42.64	3.21	24	32.00	3.19	26.83	3.18
19.12	3.19	43.35	3.22	25	32.55	3.20	27.29	3.20
19.58	3.21	44.11	3.25	26	33.12	3.23	27.77	3.21
20.06	3.23	44.88	3.26	27	33.71	3.25	28.27	3.24
20.55	3.24	45.68	3.29	28	34.32	3.27	28.80	3.27
21.08	3.28	46.52	3.32	29	34.96	3.30	29.34	3.28
21.63	3.31	47.39	3.35	30	35.62	3.32	29.90	3.32
22.22	3.34	48.29	3.38	31	36.31	3.36	30.50	3.36
22.83	3.37	49.23	3.41	32	37.02	3.40	31.11	3.39
23.48	3.42	50.20	3.46	33	37.76	3.44	31.75	3.43
24.16	3.46	51.20	3.51	34	38.54	3.49	32.42	3.48
24.89	3.51	52.25	3.55	35	39.35	3.54	33.13	3.52
25.66	3.57	53.32	3.62	36	40.18	3.60	33.87	3.59
26.46	3.63	54.46	3.67	37	41.06	3.65	34.63	3.65
27.33	3.71	55.63	3.75	38	41.98	3.73	35.44	3.71
28.24	3.78	56.84	3.82	39	42.92	3.80	36.28	3.79
29.20	3.87	58.11	3.91	40	43.93	3.88	37.18	3.88

ENDOWMENTS

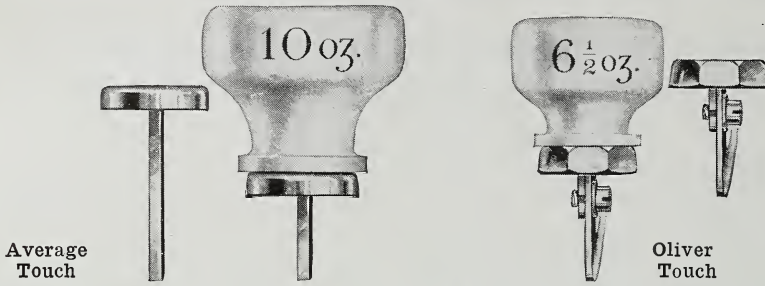
10 Year.		15 Year.		Age	20 Year.		25 Year.	
Prem	Div.	Prem.	Div.		Prem.	Div.	Prem.	Div.
\$97.34	\$3.25	\$62.29	\$3.20	21	\$45.21	\$3.17	\$35.32	\$3.16
97.40	3.26	62.37	3.21	22	45.30	3.18	35.42	3.17
97.47	3.28	62.45	3.23	23	45.38	3.20	35.52	3.18
97.54	3.29	62.52	3.23	24	45.47	3.21	35.62	3.19
97.60	3.31	62.60	3.25	25	45.56	3.22	35.74	3.20
97.69	3.32	62.70	3.27	26	45.67	3.24	35.86	3.23
97.77	3.34	62.79	3.29	27	45.78	3.27	36.00	3.25
97.87	3.37	62.90	3.31	28	45.90	3.28	36.15	3.27
97.97	3.39	63.01	3.34	29	46.04	3.31	36.30	3.30
98.07	3.42	63.13	3.36	30	46.18	3.34	36.48	3.33
98.17	3.45	63.26	3.40	31	46.34	3.37	36.67	3.36
98.30	3.48	63.40	3.44	32	46.51	3.41	36.88	3.40
98.42	3.53	63.55	3.48	33	46.69	3.46	37.10	3.44
98.56	3.56	63.72	3.52	34	46.90	3.50	37.36	3.48
98.71	3.62	63.90	3.57	35	47.12	3.54	37.64	3.53
98.88	3.69	64.09	3.62	36	47.36	3.59	37.96	3.59
99.05	3.74	64.32	3.68	37	47.64	3.67	38.30	3.65
99.25	3.81	64.55	3.76	38	47.94	3.73	38.68	3.71
99.45	3.87	64.82	3.82	39	48.27	3.81	39.11	3.79
99.69	3.96	65.10	3.92	40	48.65	3.90	39.57	3.88

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Now mark the story this test tells. To operate the average typewriter requires a 10-ounce pressure on the keys. Some $7\frac{1}{2}$, some $13\frac{1}{2}$. Mark that the Oliver writes at $6\frac{1}{2}$ ounces—scaled down to 50% lighter. And it wins its leadership in other points, too.

Here again a service to the world—the new model Oliver—the Silent Seven. A benefaction to all mankind. Labor of thousands lightened. With touch so sensitive that experts marvel—the weight of your finger, tapped on the key.

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Place some small, flat object on a key of the average typewriter. Add enough objects to make the key write. Now perform this experiment with the Oliver No. 7, set at equal tension. Then weigh the two sets of objects. Your nearest druggist can do so if you have no handy means.

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Yet, without once piling the letters.

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The Silent Seven

This brilliant triumph has all our epoch-making inventions—visible writing, visible reading, fewest keys, and Printype if desired.

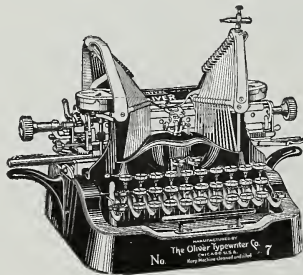
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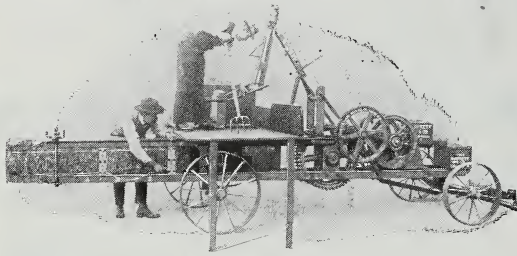
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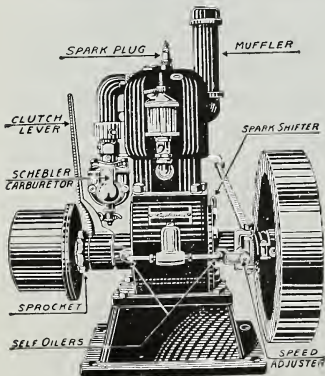
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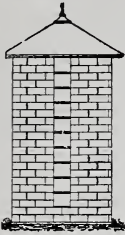
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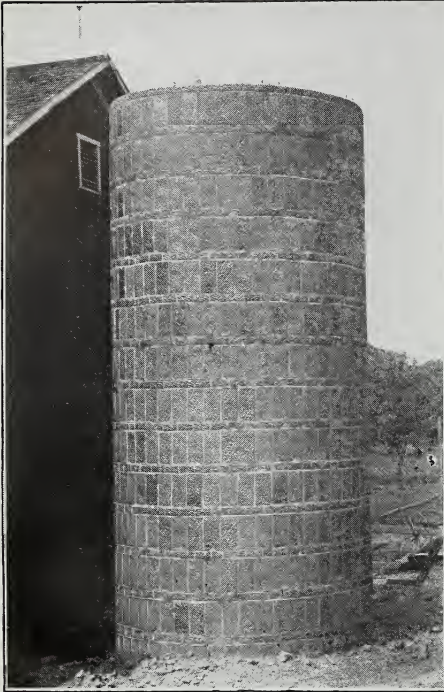
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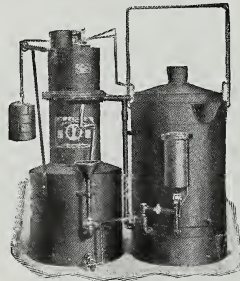
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